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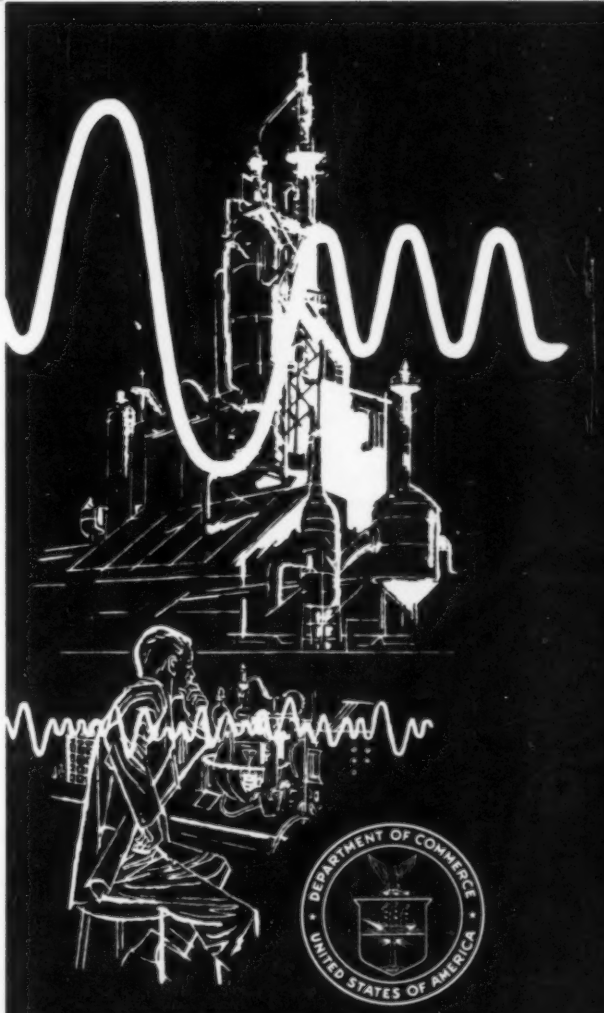

U. S. DEPARTMENT OF COMMERCE
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U.S. DEPARTMENT OF COMMERCE
Luther H. Hodges, *Secretary*

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JUNE DEMONSTRATION UNIT WAS OPERATED AT 9 MC ON 32 WORDS AND 9 DIGITS. LIGHTNING TEST MACHINE; DYNAMIC TESTS WERE PERFORMED ON PRODUCTION RUN LTM LOGIC MODULES.
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***RADAR DUPLEXERS**
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TEN PROTOTYPE 1 KW DUPLEXERS (MICROWAVE) WERE FABRICATED AND TESTED A TOTAL OF SEVENTY HOURS TO DETERMINE RELIABILITY IN OPERATION.
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*RADIO SIGNALS
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*RADIOFREQUENCY GENERATORS
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DEVELOPMENT OF C- AND X-BAND TRANSISTORIZED POWER GENERATORS.
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*RADIOFREQUENCY POWER
RADIOFREQUENCY PULSES

DEVELOPMENT OF C- AND X-BAND TRANSISTORIZED POWER GENERATORS.
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*RADIOFREQUENCY PULSES
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PROJECT LIGHTNING QUARTERLY REPORT, 1 OCT 57 TO 30 DEC 57.
AD-297 791 JIV. 8

PROJECT LIGHTNING QUARTERLY REPORT, 31 DEC 57 TO 30 MAR 58.
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THE ACTIVATED SINTERING OF TUNGSTEN POWDER.
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THE ACTIVATED SINTERING OF TUNGSTEN POWDER.
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THEORETICAL INVESTIGATION AND CONTROL BY MEASURING TESTS ON THE BEHAVIOR OF THE THREE-DIMENSIONAL TURBULENT BOUNDARY LAYER ON AN ANNULAR WING AT VARIOUS INCIDENCES.
AD-297 809 ,div. 9

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DYNAMIC NON-LINEAR WAVE PROPAGATION IN IONIZED MEDIA. PROPERTIES OF NON-LINEAR TRAVELLING AND STANDING PLASMA WAVES IN HOMOGENEOUS, IONIZED COLD STREAMS.
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THERMODYNAMIC PROPERTIES OF SOLID NICKEL-ZINC ALLOYS IN THE ALPHA F.C.C. PHASE FROM VAPOR PRESSURE DATA MEASUREMENTS AT 900 TO 1400 C.
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***ZONE MELTING**
INDUCTION HEATING

THE DEVELOPMENT OF APPARATUS AND PROCESS FOR ZONE REFINING TUNGSTEN BY INDUCTION MELTING.
AD-297 541 ,IV. 17

TECHNICAL ABSTRACT BULLETIN

1. AIRCRAFT AND FLIGHT EQUIPMENT

AD-297 099 Div. 1, 2
(TISTP/MB) OTS price $7.60

Air Force Cambridge Research Labs., Bedford, Mass.
SUPERPRESSURE BALLOON FOR CONSTANT LEVEL FLIGHT, by L. A. Grass. Aug 62, 62p. incl. illus. tables, 21 refs. (Rept. nos. AFCRL 62-824; IGA no. 21)
Unclassified report

DESCRIPTORS: *Balloons, *Astrophysics, Plastics, Polyethylene plastics, Configuration, Design, Theory, Stresses, Mathematical analysis, Stability, Geophysics, Stratosphere, Flight paths, Instrumentation.

The superpressure balloon is a sealed, virtually non-extensible plastic cell that will float at a constant density altitude despite diurnal fluctuations in the ''superheat'' of the lifting gas. This type of balloon does not require ballast to maintain altitude. Instead, it depends upon the ability of the plastic cell to retain all of the lifting gas without significant change in volume, at varying pressures that always remain higher than ambient. The superpressure balloon is more efficient, and is considerably smaller than the valved balloon designed for the same altitude, payload and duration. It provides a highly stable platform for long-duration experiments in the stratosphere. General equations relating superpressure, superheat and free lift are derived and the allowable temperature-fluctuation limits for maintaining altitude are considered. The stringent physical requirements imposed upon suitable materials and some of the special materials-testing procedures for superpressure application are discussed. Design equations are given for the cylindrical, tetrahedral, onion and spherical shapes. (Author)

AD-297 214 Div. 1
(TISTA/FRL) OTS price $18.50

Ryan Aeronautical Co., San Diego, Calif.
FLEXIBLE WING CARGO GLIDERS. DESIGN CRITERIA AND AERODYNAMICS, VOLUME II.
15 Sep 62, 283p. incl. illus. tables, refs.
(Contract DA 44-177-tc-779)
(TCREC 62-3B) Unclassified report

DESCRIPTORS: *Gliders, *Parawings, Aerodynamic characteristics, Design, Configuration, Payloads, Analysis, Aerodynamic configurations, Stability, Control systems, Airframes, Towing planes, Helicopters, Structures, Transport planes, Towing cables, Dynamics, Materials, Flight testing, Loading (Mechanics), Tests, Stresses, Cargo.

A study was made to determine the feasibility of the development of cargo gliders using the Rogallo type Flexible Membrane Wing. Designs are presented for configurations with payload capacities of 250, 1000, 4000, and 8000 pounds each. Design and technical analysis of each configuration is presented. Requirements for the modification of standard air and rotor craft to be used for towing or air launching of the gliders are presented.

AD-297 218 Div. 1
(TISTE/OHD) OTS price $6.60

Walker, Norman K., Associates, Inc., Bethesda, Md.
THE EFFECT OF THE VERTICAL POSITION OF THE CENTER OF GRAVITY ON THE STABILITY OF AN ANNULAR JET GROUND EFFECT MACHINE.
Dec 62, 54p. incl. illus. tables.
(Contract DA 44-177-tc-830)
(TCREC TR 62-101) Unclassified report

DESCRIPTORS: *Ground effect machines, *Aerodynamic characteristics, Flight testing, Tests, Partial differential equations, Mathematical analysis, Roll, Jets, Stability.

Measurements were made on an electrically powered, annular, thin jet Ground Effect Machine in hovering flight to determine: the lift versus height at various power levels; the restoring moment and sideforce due to the angle relative to the ground; the roll stability with the machine pivoted at base, and then at intermediate and high positions above the base, with the center of gravity low, high and extra high for each pivot position; and the behavior of the machine with the pivot free to move sideways. Finally the machine was flown without any constraints in the low, high and extra high CG positions. It was determined that the lift vector remains normal to the base within an angle not greater than 0.06 times the angle between the machine and the ground, and that the stability is virtually unaffected by the height of the CG relative to the base, provided that the machine is clear of contact with the ground or any other obstacle. The experiments are illustrated by 16 diagrams and 4 photographs. An 8mm. color movie was made showing each of the tests in the order in which they were performed. (Author)

AD-297 437 Div. 1
(TISTA/FRL) OTS price $8.10

Ryan Aeronautical Co., San Diego, Calif.
FLEXIBLE-WING CARGO GLIDERS. VOLUME I.
Final program summary rept.
15 Sep 62, 79p. incl. illus. tables (Rept. no. 61B114(A))
(Contract DA 44-177-tc-799, Proj. 9R38-01-017-72)
(TCREC TR 62-3A) Unclassified report

DESCRIPTORS: *Gliders, *Parawings, Wings, Configuration, Load distribution, Towing cables, Control systems, Flight testing, Landings, Take-off, Stability, Control, Armed forces operation, Instrumentation, Design, Transport planes, Cargo.

This report presents descriptions of the Flexible Wing Cargo Glider configurations design, design criteria, strength and loads, weight analysis,

and a description of the towing and control systems. The characteristics of free-flight performance, towed performance, take-off and landing, and stability and control are also discussed. Operational utilization and effectiveness of the Flexible Wing Cargo Gliders, as applied to the operation of the U. S. Army, are briefly discussed. (Author)

AD-297 483 Div. 1
(TISTE/JWS) OTS price $8.10

Bell Helicopter Corp., Fort Worth, Tex.
DEVELOPMENT OF A SUBMINIATURE SURFACE MOUNTED PRESSURE TRANSDUCER.
Summary rept.,
by F. Burpo. Jan 63, 75p. (Rept. no. 299-099-200)
(Contract Nonr-287700)
Unclassified report

DESCRIPTORS: *Subminiature electronic equipment, *Pressure gages, Strain gages, Bonding, Pressure, Surface properties, Load distribution, Stresses, Temperature, Helicopter rotors, Rotor blades (Rotary wings).

AD-297 487 Div. 1, 4
(TISTA/GEC) OTS price $3.60

MSA Research Corp., Callery, Pa.
HYDROGEN GENERATION FOR HIGH ALTITUDE BALLOONS.
Quarterly progress rept. no. 2, 1 Oct 62-1 Jan 63,
by W. J. Carter, R. A. Spencer, and M. J. McGoff.
26 Feb 63, 35p. (Rept. no. MSAR 63-17)
(Contract DA 36-039-sc-90699, Proj. no. 3M-36-21-004-02)
Unclassified report

DESCRIPTORS: *Meteorological balloons, *Gas generating systems, Tanks (Containers), Storage, Sodium compounds, Borohydrides, Hydrides, Aluminum compounds, Tests, Hydrogen.

AD-297 805 Div. 1, 15
(TISTA/FRL) OTS price $2.75

Systems Technology, Inc., Inglewood, Calif.
PERFORMANCE CRITERIA FOR LINEAR CONSTANT-COEFFICIENT SYSTEMS WITH RANDOM INPUTS.
Final rept.,
by Raymond Magdaleno and Julian Wolkovitch.
Jan 63, 128p. (Rept. no. STI TR-121-1)
(Contract AF 33(616)7841, Proj. 8219)
(ASD TDR 62-470) Unclassified report

DESCRIPTORS: *Flight control systems, Tests, Stability, Pitch (Motion), Control systems, Integral equations, Errors, Special functions (Mathematical), Analog systems, Analysis, Linear systems.

AD-297 924 Div. 1
(TISTA/LSK) OTS price $1.10

Naval Ordnance Test Station, China Lake, Calif.
VIBRATION STUDIES FOR JET FIGHTER AND ATTACK BOMBER AIRCRAFT INSTRUMENTATION,
by Howard C. Schafer. Feb 63, 8p. (NOTS TP 3026)
Unclassified report

DESCRIPTORS: *Jet fighters, *Attack bombers, *Flight instruments, Jet bombers, Instrumentation, Vibration.

AD-297 940 Div. 1, 9
(TISTA/LSK) OTS price $23.50

Bell Helicopter Corp., Fort Worth, Tex.
MEASUREMENT OF DYNAMIC AIR LOADS ON A FULL-SCALE SEMIRIGID ROTOR.
Rept. for July 60-June 62,
by F. B. Burpo and R. R. Lynn. Dec 62, 473p.
(Rept. no. 525-099-001)
(Contract DA 44-177-tc-653)
(TCREC TR 62-42) Unclassified report

DESCRIPTORS: *Helicopter rotors, *Rotor blades (Rotary wings), Helicopters, Flight testing, Moments, Mathematical analysis, Digital computers, Tables, Experimental data, Measurement, Maneuverability, Load distribution, Deformation, Aerodynamic loading.

AD-297 945 Div. 1, 9
(TISTA/LSK) OTS price $9.10

Autonetics, Downey, Calif.
ANNOTATED BIBLIOGRAPHY OF LITERATURE CONCERNING GUST ALLEVIATION TECHNIQUES, LOW-ALTITUDE ATMOSPHERIC TURBULENCE, AND RELATED TOPICS,
comp. by Barbara Ann Bryce. 14 Feb 63, 1v.
(Rept. no. EM 1163-104)
(Contract DA 44-177-AMC-858(T))
Unclassified report

DESCRIPTORS: *Bibliographies, *Gust loads, Atmospheric motion, Gusts, Turbulence, Aircraft, Airplanes, Jet planes.

2. ASTRONOMY, GEOPHYSICS AND GEOGRAPHY

AD-297 111 Div. 2, 25
(TISTP/WH) OTS price $1.60

California U., Berkeley.
SIMULTANEOUS ELECTRON PRECIPITATION IN THE NORTHERN AND SOUTHERN AURORAL ZONES,
by R. R. Brown, K. A. Anderson and others.
7 Feb 63, 14p. incl. illus. table, 3 refs.
(AFOSR-420) Unclassified report

DESCRIPTORS: *Electrons, *Aurorae, *X-rays, Ionospheric disturbances, Atmosphere.

During simultaneous high-altitude balloon flights from College, Alaska, and Macquarie Island, Australia, on March 5, 1962, substantial fluxes of auroral zone X-rays were observed in both hemispheres during magnetic bay activity. The X-ray observations indicate that the electron influx in both hemispheres extended over a region 3 degrees wide in latitude and 16 degrees in longitude. The near equality of the X-ray fluxes in both auroral zones suggests that the electron precipitation originated from processes far out on the lines of force, near the equatorial plane. The magnetic and ionospheric disturbances accompanying the X-ray event are discussed. (Author)

AD-297 137 Div. 2
(TISTP/JW) OTS price $8.60

Army Engineer Geodesy, Intelligence and Mapping Research and Development Agency, Fort Belvoir, Va.
DETERMINATION OF THE GEOMETRICAL QUALITY OF COMPARATORS FOR IMAGE COORDINATE MEASUREMENTS,
by K. Bertil and P. Hallert. 1 Aug 62, 95p. incl. illus. tables (GIMRADA Research note no. 3)
Unclassified report

DESCRIPTORS: *Photogrammetry, *Images, Least squares method, Mapping, Geodesics, Measurement, Geometric forms.

The development and practical application of test procedures are used to determine the geometrical quality of comparators for image coordinate measurement. The procedures are founded upon grid coordinate measurements under operational conditions. First the basic principles for the determination of the accuracy of the measurements have been treated under different assumptions concerning the number and the positions of the test points. The principles of the method of least squares have been applied throughout, for the determination of regular (systematic) errors of the measured data as well as for the estimation of a statistical value of the irregular errors and for the error propagation in functions of the basic observations. The derivations have been made for grids, the given coordinates of which can be regarded to be errorless and for grids where certain regular errors are assumed to be present in the given coordinates. The theoretical derivations have been used for testing a number of comparators of different types. Also some determinations of absolute scales have been performed. The lowest standard error of unit weight found in a comparator is of the order of magnitude 1 micron. Normal distribution tests of the residuals have been performed throughout. (Author)

AD-297 154 Div. 2
(TISTP/JW) OTS price $11.00

Marine Lab., U. of Miami, Coral Gables, Fla.
A REPORT OF DATA OBTAINED IN FLORIDA STRAITS AND OFF THE WEST COAST OF FLORIDA, JANUARY-JUNE 1962.
Dec 62, 138p. incl. illus. tables (Rept. no. 62-11; Rept. no. ML 63116)
(Contract Nonr-84001)
Unclassified report

DESCRIPTORS: *Oceanographic data, Sampling, Marine biology, Instrumentation, Data processing systems, Crustacea, Tables.

Data collected during the first half of 1962 in Florida Straits, the eastern part of the Gulf of Mexico, and the Yucatan Channel are presented. The data were obtained for studies of the oceanographic conditions prevailing in Florida Straits and adjacent waters, with particular regard to the kinematics of the water movements and also to the physical environment of the shrimp population inhabiting the region of the Tortugas Shelf. (Author)

AD-297 172 Div. 2, 6
(TISTW/JEA) OTS price $6.60

Woods Hole Oceanographic Institution, Mass.
DEVELOPMENT OF SOUND ANALYSIS EQUIPMENT FOR SONAR RESEARCH. PART III.
Final rept.,
by Lincoln Baxter and Vernon Chi. Oct 61, 38p. illus. tables, refs. (Reference no. 61-32)
(Contract Nonr-212900, Proj. NR 261-104)
Unclassified report

DESCRIPTORS: *Analog computers, *Sonar signals, *Sound transmission, Amplifiers, Acoustic impedance, Sonar pulses, Integrals, Fourier analysis, Multipath transmission, Integration, Phase shifters, Oceanographic equipment, Measurements, Correlation techniques, Underwater sound.

An eight-channel analog computer was developed for hydroacoustic and geophysical oceanographic studies. This computer drives Sanborn pens to produce a deflection proportional to the total energy received at an input after any desired instant. Alternatively, a deflection proportional to either amplitude, rectified amplitude, or power, averaged over a selected time interval or proportional to certain functions useful for studies of the correlation of signals at two inputs may be produced. These latter functions are the product of the amplitudes at the inputs and the sum of the squares of these amplitudes. (Author)

AD-297 196 Div. 2, 8
(TISTP/JW) OTS price $11.50

Aeronutronic, Newport Beach, Calif.
RESEARCH ON THEORETICAL STUDIES OF THE STATISTICAL CHARACTERISTICS OF SUNLIT CLOUDS, VOLUME I,
by E. Bauer, D. C. Garwood and others.
14 Oct 62, 1v. incl. illus. tables, refs.
(Publication no. S-1876)
(Contract Nonr-360600)
Unclassified report

DESCRIPTORS: *Clouds, *Solar radiation, Detection, Guided missiles, Energy, Atmospheric refractions, Signals, High altitude, Reflection.

The work discusses the reflectivity of solar infrared from high altitude clouds, and the effect of the energy reflected from these clouds on the statistical performance criteria of a satellite-borne missile detection system. The scattering of infrared from clouds of spherical water droplets has been treated by Mie theory. For wavelengths in the range 2.5 - 10 micron, and for large angle scattering the effective reflectivity is due to single rather than to multiple scattering by water droplets. The effective diffuse reflectivity under these conditions is of the order of 1 - 2 percent. For actual situations, some discussion has been given of atmospheric transmission losses as well as of meteorological data on the distribution of high altitude clouds. The statistical problem consists of the detection of rare high radiance signals in a background having occasional high radiance levels. The detection criterion thus involves maximizing peak rather than mean signal-to-noise ratios. An analysis in terms of likelihood ratios is developed, and it is shown that the Neyman-Pearson criterion provides a usable partial maximization of signal detection probability. (Author)

AD-297 226 Div. 2
(TISTP/TL) OTS price $1.10

Warner and Swasey Observatory, Case Inst. of Tech., Cleveland, Ohio.
INTRINSIC PROPERTIES OF GIANT M STARS, II.
Annual summary rept.,
by Victor M. Blanco. 11 Jan 63, 5p.
(Contract Nonr-340300, Proj. NR 046-784)
Unclassified report

DESCRIPTORS: *Stars, Photometers, Spectroscopy, Variable stars, Spectrum analyzers, Astronomical observatories, Interstellar matter.

AD-297 242 Div. 2, 30
(TISTP/JW) OTS price $2.60

Electrical Engineering Research Lab., U. of Texas, Austin.
OPERATION AND PERFORMANCE OF THE CEDAR HILL METEOROLOGICAL TOWER FACILITY.
Final rept.,
by W. S. Mitcham and J. R. Gerhardt. 31 Dec 62, 19p. incl. table, 5 refs. (Rept. no. 4-07)
(Contract AF 19(604)5556, Proj. 7655)
(AFCRL 63-202) Unclassified report

DESCRIPTORS: *Weather stations, *Meteorology, Analog-to-digital connections, Errors, Reliability, Data processing systems, Research program administration, Instrumentation.

A brief survey is presented of the sensor and readout instrumentation associated with the Cedar Hill meteorological tower facility together with an analysis of its performance during the first two years of operations. Factors giving rise to system errors such as those involved in analog-to-digital conversion, digital code conversion, integrator drift, input scaling and sensor malfunctioning are discussed and tabulations are presented of their frequency distributions. Procedures are given for the detection of these errors and for the modifications which have been and will be made for their correction or reduction. (Author)

AD-297 289 Div. 2, 8
(TISTP/WH) OTS price $8.10

Geophysical Inst., U. of Alaska, College.
RADIO PROPERTIES OF THE AURORAL IONOSPHERE. PART 3.
Final rept.
Mar 62, 76p. incl. illus. tables, refs.
(Contract AF 30(635)2887, Proj. 5535)
(RADC TR 61-217, pt. 3) Unclassified report

DESCRIPTORS: *Aurorae, *Radio waves, *Extraterrestrial radio waves, Atmospheric refraction, Ionosphere, Interference, Radio astronomy.

Contents:
Observations of radio star scintillations during aurora
Radio star scintillations and spread F
Scintillation of satellite radio signals in the auroral zone
Satellite radio signal determinations of upper F region electron densities in the auroral zone
Observations of high latitude radio aurora

AD-297 328 Div. 2
(TISTW/JEA) OTS price $1.10

General Dynamics/Convair, San Diego, Calif.
ANALYSIS OF ATMOSPHERIC DUST.
Report on Material - Atmospheric Dust Constitution,
by M. A. McGowan, G. N. Kruse and E. E. Keller.
10 June 59, 4p. illus. tables (Rept. no. 8926-110)
(Contract AF 33(657)8926)
Unclassified report

DESCRIPTORS: *Dust storms, *Particle size, Particles, Temperature, Humidity, Velocity, Analysis, Atmospheric pollution, Atmosphere.

The weight of dust per unit volume of air, the number of particles of dust per unit volume of air, and dust particle size in the atmosphere at Lindberg Field, San Diego, California, was determined with a hi-vol sampler dust counter, and an aerosol filter apparatus. A dust concentration of 4.12 x 10 to the -3rd power mg. per cu. ft. was found when the temperature was 68 F, the humidity, 64 per cent; and the wind, SW at 9 knots. From 22.2 to 33.4 million particles of dust per cubic foot of air were found when the temperature was 69 F; the humidity, 68 per cent; and the wind WNW at 6 knots. A dust particle analysis made when the temperature was 67 F; the humidity, 61 per cent; and the wind NW at 8 knots showed that the majority of the dust particles (74 per cent) was under one micron in size. A complete analysis of dust particle size is reported. (Author)

AD-297 344 Div. 2, 20
(TISTP/JW) OTS price $3.60

Air Force Technical Applications Center, Washington, D. C.
LONG RANGE SEISMIC MEASUREMENTS: STOAT.
Report on Vela-Uniform Proj. 8.4.
31 Dec 62, 1v. incl. illus. tables.
Unclassified report

DESCRIPTORS: *Seismic waves, *Nuclear explosions, Instrumentation, Tables, Measurement, Underground explosion.

AD-297 351 Div. 2
(TISTP/JW) OTS price $8.60

Army Engineer Geodesy, Intelligence and Mapping Research and Development Agency, Fort Belvoir, Va.
INVESTIGATIONS OF BASIC GEOMETRIC QUALITY OF AERIAL PHOTOGRAPHS AND SOME RELATED PROBLEMS,
by K. Bertil P. Hallert. 17 Aug 62, 86p. incl. illus. tables, 13 refs. (Research note no. 4)
Unclassified report

DESCRIPTORS: *Aerial photography, *Geodesics, Calibration, Images, Instrumentation, Mapping, Reliability, Quality control.

A series of tests are presented of the basic geometrical quality of photographs obtained from aerial camera calibrations in a multicollimator and from aerial photography obtained under operational conditions. The elements of the interior orientation and the most important regular (systematic) errors of the image coordinates are determined as parameters in least squares adjustments, and the remaining irregular errors of the image coordinates are estimated as standard errors of unit weight of the image coordinates. In the multicollimator tests, film and glass plate negatives were tested and compared concerning the geometrical quality. A criterion for tangential distortion is developed, and some correlation effect between residual image coordinate errors is studied. A variation of the geometrical quality (weight) of image coordinates was found, and some possible reasons for this variation are more closely investigated. The resolving power, the thickness variations of films, and the locations of developed grains (details) within the emulsion were preliminarily studied. Some tests of diapositive printers were made. (Author)

AD-297 352 Div. 2
(TISTP/JW) OTS price $6.60

Army Engineer Geodesy, Intelligence and Mapping Research and Development Agency, Fort Belvoir, Va.
INVESTIGATION OF THE GEOMETRICAL QUALITY OF THE RELATIVE AND ABSOLUTE ORIENTATION PROCEDURES AND THE FINAL RESULTS OF THE PHOTOGRAMMETRIC PROCEDURE,
by K. Bertil P. Hallert. 24 Aug 62, 61p. incl. illus. tables, 10 refs. (Research note no. 6)
Unclassified report

DESCRIPTORS: *Photogrammetry, *Measurement, Least squares method, Mapping, Geodesic, Geometric forms, Reliability.

A theoretical investigation is presented of the determination of the basic geometrical quality of the relative and absolute orientation procedures and the propagation of the errors from these operations to the final results of the photogrammetric procedure, including the elements of the exterior orientation. The geometrical quality is determined as standard errors

from the standard error of unit weight of the basic data: image coordinates, parallaxes, and model coordinates. The principle of compensation between the elements of the absolute and the relative orientations is applied. Comparisons of the geometrical quality to be expected from normal-angle, wide-angle, and superwide-angle photographs have been made. It is concluded that: the method of least squares and its laws of error propagation allow a well-defined theoretical determination of the geometrical quality to be expected in the final results of the photogrammetric procedure in terms of the standard errors of the y-parallaxes; the theoretical geometrical quality of the elements of the exterior orientation after double- and single-point resections in space can be determined in this way only; the influence of the errors of the interior orientation must be taken into account; and tolerance limits for the relative and absolute orientations can be derived from the results of these investigations. (Author)

AD-297 368 Div. 2
(TISTP/WH) OTS price $13.00

Michigan U. Coll. of Engineering, Ann Arbor.
A STUDY OF RAINDROP-SIZE DISTRIBUTIONS AND THEIR VARIATION WITH HEIGHT.
by Kenneth R. Hardy. Dec 62, 174p. incl. illus. tables, refs. (Scientific rept. no. 1)
(Contract AF 19(628)281, Proj. 8620)
(AFCRL 62-1091) Unclassified report

DESCRIPTORS: *Raindrops, *Meteorological radar, *Statistical distributions, *Spectrophotometers, Atmospheric precipitation, Meteorology, Measurement, Phototubes.

Rain is described in terms of raindrop-size distributions and these distributions are related to the physical processes which affect the growth or evaporation of the raindrops. The work contributes to our understanding of the final stage of precipitation growth, and provides information which is useful in the interpretation of weather radar observations. Computations of the changes of the raindrop-size distributions with distance fallen are made using an electronic digital computer. Assuming a steady mass flux of raindrops just below the melting level, changes brought about in the distribution through coalescence among raindrops, by accretion of cloud droplets, and by evaporation are considered. It is shown that the numerical procedures which are used introduce negligible errors in the computations. In addition, these procedures remove all restraints on the form of the initial raindrop-size distribution, and on the properties of the cloud and the atmosphere through which the drops are falling. (Author)

AD-297 388 Div. 2, 8
(TISTW/RD) OTS price $1.60

Aerospace Information Div., Washington, D. C.
PHENOMENA IN THE UPPER ATMOSPHERE. REVIEW OF SOVIET LITERATURE.
Monthly rept. no. 31 for Nov 62.
13 Feb 63, 17p. 18 refs. (AID rept. no. P-62-23)
Unclassified report

DESCRIPTORS: *Upper atmosphere, *Solar radiation, *Solar atmosphere, *Extraterrestrial radio waves, Ionosphere, Meteorology, Solar corona, Terrestrial magnetism, Magnetic fields, Solar eclipses, Solar flares, Radio astronomy, Sunspots, Scientific research, Radio waves, Spectrophotometers.

AD-297 431 Div. 2
(TISTP/JVP) OTS price $18.00

Texas Western Coll., El Paso.
DETERMINATION OF ATMOSPHERIC PARAMETERS BY ACOUSTIC MEANS.
Progress rept. no. 1, 14 Nov 61-25 June 62.
July 62, 285p. incl. illus. tables, refs.
(Grant no. DA-SIG-36-039-62-G17)
Unclassified report

DESCRIPTORS: *Atmospheric sounding, *Transducers (Acoustic), *Atmospheric temperature, Sound transmission, Absorption, Atmosphere, Acoustic detectors, Sound generators, Upper atmosphere, Acoustics, Instrumentation, Airborne, Measurement.

During this initial period emphasis was placed on (1) survey of literature; (2) theoretical and experimental investigation of problems inherent in performing acoustic measurements in the upper atmosphere by means of devices on moving platforms; and (3) the theory, design, development, and testing of an airborne acoustic interferometer (Sonotherm) for performing local acoustic measurements in the upper atmosphere. (Author)

AD-297 460 Div. 2
(TISTB/AW) OTS price $5.60

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
SCALE MODEL STUDIES ON SNOW DRIFTING,
by Gordon H. Strom, George R. Kelly and others.
Sep 62, 50p. incl. illus. tables, refs. (Research rept. no. 73)
Unclassified report

DESCRIPTORS: *Snow, Models (Simulations), Theory, Polar regions, Wind tunnels, Mathematical analysis, Simulation, Drift.

Snow-drifting characteristics of various structures were studied by scale-model wind-tunnel experiments. A number of materials were tested for physical properties which would make them suitable for snow simulators. It was found that, for a 1/10 model scale, 0.01 cm diam crystalline borax was the best available material. The work performed in the 3 1/2 by 7 ft wind tunnel adequately demonstrated the feasibility of using geometrically and physically scaled synthetic snow in a wind tunnel. It was also shown that it is possible to present several years of arctic snowstorm environment in a few hours of wind-tunnel time. The actual tests showed these major points: (1) Close spacing of buildings will result in coalescence of drifts. (2) When rectangular buildings must be grouped in closely spaced units, they should be erected with the long axis parallel to the dominant wind direction. (3) Snow erosion may occur beneath buildings erected on columns above the surface. (4) A V-shaped snow fence produced a clear area downwind for a distance equal to approximately 25 times the height of the fence. (Author)

AD-297 492 Div. 2
(TISTW/RD) OTS price $10.10

Texas Instruments, Inc., Dallas.
TERRAIN QUANTIFICATION. PHASE I: SURFACE GEOMETRY MEASUREMENTS.
Final rept.,
by Donald D. Carr and Jack R. Van Lopik.
31 Dec 62, 85p. refs.
(Contract AF 19(628)481, Proj. 7628)
(AFCRL 63-208) Unclassified report

DESCRIPTORS: *Terrain, *Bibliographies, Hydrographic surveying, Soils, Geology, Plants (Botany), Classification, Military requirements, Mapping.

Division 2 - ASTRONOMY, GEOPHYSICS AND GEOGRAPHY

AD-297 501 Div. 2
(TISTP/JW) OTS price $21.00

Massachusetts Inst. of Tech., Cambridge.
ATMOSPHERIC MOMENTUM AND ENERGY CALCULATIONS FOR THE SOUTHERN HEMISPHERE DURING THE IGY,
by Godwin Olu Patrick Obasi. 1 Jan 63, 354p.
(Scientific rept. no. 6)
(Contract AF 19(604)6108, Proj. 8628)
(AFCRL 62-1128) Unclassified report

DESCRIPTORS: *Atmospherics, *Wind, Diurnal variations, Climatology, Meteorology, Motion, Measurement.

AD-297 511 Div. 2, 12
(TISTA/GEC) OTS price $4.60

RIAS, Inc., Baltimore, Md.
NEUTRON MEASUREMENTS OUTSIDE THE EARTH'S ATMOSPHERE.
Final rept.,
by L. Witten and J. P. Martin. Jan 63, 27p. illus.
(Contract AF 19(604)7244, Proj. 1764)
(AFCRL 63-214) Unclassified report

DESCRIPTORS: *Scientific satellites, *Fast neutrons, Neutron flux, Neutron cross sections, Dose rate, Mathematical analysis, Albedo, Shielding, Van Allen radiation belt, Proton bombardment, Density, Neutron counters, Measurement.

AD-297 513 Div. 2
(TISTP/JW) OTS price $10.10

American Meteorological Society, Boston, Mass.
MACROTURBULENCE IN THE GENERAL CIRCULATION OF THE ATMOSPHERE (Makroturbulentnost' v obshchei tsirkuliatsi atmosfery),
by G. V. Gruza, tr. by Robert Sholiton. July 62, 125p. (Trans. no. T-R-394 from Leningrad, Gidrometeorologicheskoe izdatel'stov, 1961)
(Contract AF 19(604)6113)
Unclassified report

DESCRIPTORS: *Atmospherics, Climatology, Air mass analysis, Turbulence, Meteorology, Motion.

AD-297 547 Div. 2
(TISTP/FR) OTS price $5.60

Army Missile Command, Redstone Arsenal, Huntsville, Ala.
CLIMATOLOGICAL RINGBOOK. PART XXIV. EMPIRICAL FREQUENCY DISTRIBUTIONS OF PRESSURE, TEMPERATURE AND AIR DENSITY AT LEVELS OF CONSTANT ALTITUDE, ALBROOK AIR FORCE BASE, PANAMA CANAL ZONE.
8 Nov 61, 62p. incl. tables, 7 refs. (Rept. no. RR-TR-61-28)
Unclassified report

DESCRIPTORS: *Atmosphere models, Barometric pressure, Temperature, Density, Statistical analysis.

Climatological parameters of barometric pressure, air temperature and air density in relation to the ARDC Model Atmosphere 1959 at 1 km altitude intervals for the location Albrook Air Force Base, Panama Canal Zone are given. Frequency distributions were established for the twelve monthly and the annual reference periods with values of cumulative percentage frequency corresponding to the mean and plus and minus one, two and three sigma levels of normal distribution. The statistical information is based on the observational period 1951 through 1957. (Author)

AD-297 560 Div. 2
(TISTP/JW) OTS price $21.00

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
SEASONAL CHANGES IN THE GENERAL CIRCULATION OF THE ATMOSPHERE AND LONG-RANGE FORECASTS (Sezonnyye Izmeneniya Obshchey Tsirkulyatsii Atmosfery i Dolgosrochnyye Prognozy),
by A. L. Kats. 18 Jan 63, 378p. incl. illus. tables, 237 refs. (Trans. no. FTD-TT-62-498 from Gidrometeorlogicheskoye Izdatel'stvo, pp. 1-377, 1960, Leningrad)
Unclassified report

DESCRIPTORS: *Weather forecasting, Solar atmosphere, Air mass analysis, Diurnal variations, Atmospherics, Climatology.

The results are presented of the analysis of seasonal peculiarities in the formation of mean long-period characteristics of general circulation of the atmosphere and climate. The connections established between long-period variations in the circulation of the atmosphere and solar activity are used for explaining the climate fluctuations observed during the last decade, and for the extended forecasting of certain climate changes. The influence of the circulation of the atmosphere in the northern hemisphere on the development of macroscopic processes over its Atlantic-Eurasian section is determined on the basis of the formation of large-scale anomalies in the air temperature during the winter months. (Author)

AD-297 573 Div. 2
(TISTP/JW) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
THE DISTRIBUTION OF DISPERSED ELEMENTS THROUGHOUT THE COMPONENTS OF WATER BASINS,
by N. V. Timofeyev-Resovskiy. 18 Jan 63, 9p. 38 refs. (Trans. no. FTD-TT-62-1314 from Trudy Instituta Biologi , Issue 12, pp. 189-193, 1960)
Unclassified report

DESCRIPTORS: *Geochemistry, *Water, Magnetic materials, Distribution, Frequency, Earth, Chemical analysis.

AD-297 753 Div. 2
(TISTW/RD) OTS price $14.30

RAND Corp., Santa Monica, Calif.
A REPORT OF PHYSIOGRAPHIC CONDITIONS OF EASTERN VICTORIA ISLAND AND ADJACENT AREAS, NORTHWEST TERRITORIES, CANADA.
Jan 63, 200p. (Memo. no. RM-2707-1-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Terrain, *Geography, Aerial photographs, Ice, Permafrost, Glaciers, Geology, Polar regions.

AD-297 754 Div. 2
(TISTW/RD) OTS price $19.75

RAND Corp., Santa Monica, Calif.
A REPORT OF THE PHYSICAL ENVIRONMENT OF NORTHERN BAFFIN ISLAND AND ADJACENT AREAS, NORTHWEST TERRITORIES, CANADA.
Jan 63, 303p. (Memo. no. RM-2706-1-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Terrain, *Geography, Climatology, Ice, Geology, Polar regions.

AD-297 756 Div. 2
(TISTW/RD) OTS price $19.75

RAND Corp., Santa Monica, Calif.
A REPORT ON THE PHYSICAL ENVIRONMENT OF THE THELON RIVER AREA, NORTHWEST TERRITORIES, CANADA.
Jan 63, 307p. (Memo. no. RM-1903-1-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Terrain, Climatology, Permafrost, Ice, Geography, Geology.

AD-297 758 Div. 2
(TISTW/RD) OTS price $18.00

RAND Corp., Santa Monica, Calif.
A REPORT OF PHYSIOGRAPHIC CONDITIONS OF CENTRAL BAFFIN ISLAND AND ADJACENT AREAS, NORTHWEST TERRITORIES, CANADA.
Final rept.
Jan 63, 270p. (Memo. no. RM-2837-1-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Terrain, *Geography, Aerial photographs, Maps, Ice, Glaciers, Population, Geology, Polar regions.

AD-297 759 Div. 2
(TISTW/RD) OTS price $21.00

RAND Corp., Santa Monica, Calif.
A REPORT ON THE PHYSICAL ENVIRONMENT OF SOUTHERN BAFFIN ISLAND, NORTHWEST TERRITORIES, CANADA.
Jan 63, 375p. (Memo. no. RM-2362-1-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Terrain, *Geography, Climatology, Aerial photographs, Air mass analysis, Cyclones, Anticyclones, Ice, Glaciers, Geology, Polar regions.

AD-297 764 Div. 2
(TISTW/RD) OTS price $3.60

Quartermaster Research and Engineering Command, Natick, Mass.
MESOCLIMATIC TEMPERATURE DIFFERENCES IN THE FORT GREELY, ALASKA AREA,
by Arthur V. Dodd. Apr 62, 26p. (Technical rept. no. ES-3)
(Proj. 7X83-01-008) Unclassified report

Original contains color plates; all ASTIA reproductions will be in black and white. Original may be seen in ASTIA Hq.

DESCRIPTORS: *Meteorology, Temperature, Climatology, Air mass analysis, Polar regions.

AD-297 765 Div. 2
(TISTW/RD) OTS price $3.60

Quartermaster Research and Engineering Command, Natick, Mass.
MUSKEG: REVIEW OF RESEARCH,
by William C. Robison, Arthur V. Dodd, and Will F. Thompson. July 62, 32p. (Technical rept. no. ES-5)
(Proj. 7X83-01-008) Unclassified report

DESCRIPTORS: *Terrain, *Swamps, *Bibliographies, Geophysics, Polar regions, Trafficability.

AD-297 794 Div. 2, 32
(TISTW/RD) OTS price $8.10

California U., Berkeley.
A GEOGRAPHICAL RECONNAISSANCE OF THE RIO SIGUIRISUA VALLEY, CHOCO DISTRICT, COLOMBIA,
by Herbert M. Eder. Jan 63, 79p.
(Contract Nonr-365603, Proj. NR 388 067)
Unclassified report

DESCRIPTORS: *Geography, Rivers, Plants (Botany), Soils, Culture, Economics, Agriculture, Anthrapology, Insects, Tropical regions.

AD-297 795 Div. 2
(TISTW/RD) OTS price $3.60

California U., Berkeley.
NOTES ON THE COASTAL GEOGRAPHY OF TRINIDAD,
by William W. Speth. 1962, 33p.
(Contract Nonr-22211, Proj. NR 388 067)
Unclassified report

DESCRIPTORS: *Geography, Climatology, Hydrographic surveying, Geology, Terrain, Tropical regions.

AD-297 814 Div. 2
(TISTP/JW) OTS price $19.75

RAND Corp., Santa Monica, Calif.
A REPORT ON THE PHYSICAL ENVIRONMENT OF THE GREAT BEAR RIVER AREA, NORTHWEST TERRITORIES, CANADA.
Jan 63, 326p. (Memo. rept. no. RM-2122-1-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Geography, *Climatology.

AD-297 815 Div. 2
(TISTP/JW) OTS price $18.50

RAND Corp., Santa Monica, Calif.
A REPORT ON THE PHYSICAL ENVIRONMENT OF THE QUOICH RIVER AREA, NORTHWEST TERRITORIES, CANADA.
Jan 63, 284p. (Memo. rept. no. RM-1997-1-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Geography, *Climatology.

AD-297 832 Div. 2
(TISTP/JW) OTS price $10.10

American Meteorological Society, Boston, Mass.
THE GEOGRAPHY OF AFGHANISTAN (La geographie de l'Afghanistan),
by Johannes Humlum, tr. by Peter Ott. Nov 62, 118p. (Trans. no. T-F-44 from Scandinavian University Books, Copenhagen, Stockholm, Oslo and Helsinki, pp. 13-72, 101-118, 299-309, 1959)
(Contract AF 19(604)6113)
Unclassified report

DESCRIPTORS: *Geography, *Geology, Climatology.

AD-297 885 Div. 2, 25
(TISTP/WH) OTS price $1.60

Geophysics Corp. of America, Bedford, Mass.
THE SOLAR FLUX INCIDENT AT THE TOP OF THE EARTH'S ATMOSPHERE FOR THE SPECTRAL REGION 50 ANGSTROMS TO 3000 ANGSTROMS,
by E. D. Schultz and A. C. Holland. Nov 62, 14p. incl. illus. tables, 5 refs. (GCA technical rept. no. 62-26-A)
(Contract AF 33(657)9199)
Unclassified report

DESCRIPTORS: *Solar radiation, *Exosphere, *Solar spectrum, Photons.

Division 3 - CHEMICAL WARFARE EQUIPMENT AND MATERIALS

AD-297 928 Div. 2, 25
(TISTP/JW) OTS price $5.60

Army Electronics Research and Development Lab., Fort Monmouth, N. J.
DERIVATION OF EQUATIONS FOR SONIC ANEMOMETRY, by Ralph W. Armstrong. Aug 62, 56p. (AERADL technical rept. no. 2289)
Unclassified report

DESCRIPTORS: *Anemometers, *Wind, Acoustics, Instrumentation, High frequency, Design, Measurement.

AD-297 933 Div. 2
(TISTP/FR) OTS price $3.60

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
PROPAGATION THROUGH A DISTURBED IONOSPHERE: EFFECT UPON RANGE AND ANGULAR RESOLUTION. PROJECT WIDE BAND.
Radio astronomy rept., by Walter A. Flood. Jan 62, 31p. (Rept. no. UB-1363-P-4)
(Contract AF 30(602)2077)
(RADC TDR 63-103) Unclassified report

DESCRIPTORS: *Ionosphere, *Extraterrestrial radio waves, Very high frequency, Attenuation, Interference, Radio interferometers, Stars, Aurorae, Radio transmission.

AD-297 944 Div. 2
(TISTP/JW) OTS price $7.60

Illinois State Water Survey, Urbana.
RAINDROP SIZE DISTRIBUTIONS WITH RAINFALL TYPES AND WEATHER CONDITIONS, by Miyuki Fujiwara. 1961, 48p. illus. (Research rept. no. 8)
(Contract DA 36-039-sc-87290, Proj. 3A99-07-001-01)
Unclassified report

DESCRIPTORS: *Meteorological radar, Rainfall, Meteorology, Clouds, Atmospheric condensation.

AD-297 955 Div. 2
(TISTP/JW) OTS price $2.60

Te Co., Santa Barbara, Calif.
GROUND BASED MAPPING OF UPPER AIR WINDS. Quarterly progress rept. no. 2, 1 Oct-31 Dec 62, by H. P. Wurtz. 31 Dec 62, 15p. illus.
(Contract DA 36-039-sc-90685, Proj. 3A99-27-005-09)
Unclassified report

DESCRIPTORS: *Wind, *Upper atmosphere, Radiometers, Mapping, Noise, Optics, Instrumentation, Measurement.

AD-297 964 Div. 2
(TISTP/JW) OTS price $4.60

Wisconsin U., Madison.
OPERATION FREEZEUP. AN AERIAL RECONNAISSANCE OF CLIMATE AND LAKE ICE IN CENTRAL CANADA, by Robert A. Ragotzkie and James D. McFadden. Nov 62, 28p. (Technical rept. no. 10)
(Contract Nonr-120207, Proj. NR 387-022)
Unclassified report

DESCRIPTORS: *Inland waterways, *Lakes, Aerial reconnaissance, Climatology, Ice.

AD-298 005 Div. 2
(TISTP/FR) OTS price $8.10

Hydraulic Engineering Lab., U. of Calif., Berkeley.
DIFFRACTION OF PERIODIC WAVES ALONG A VERTICAL BREAKWATER FOR SMALL ANGLES OF INCIDENCE, by Arne Hasle Nielsen. Dec 62, 83p. (Technical rept. no. HEL-1-2)
(Contract DA-49-055-CIV-ENG-63-5)
Unclassified report

DESCRIPTORS: *Breakwaters, *Water waves, Reflection, Diffraction.

AD-298 045 Div. 2
(TISTB/AW) OTS price $2.60

Geophysical and Polar Research Center, U. of Wisconsin, Madison.
GRAVITY OBSERVATIONS FROM ICE ISLAND ARLIS-II, 6 OCTOBER 1961 TO 8 APRIL 1962, by D. Jan Black and Ned A. Ostenso. Nov 62, 26p. (Research rept. no. 62-8)
(Contract Nonr-120216, Proj. ONR 313)
Unclassified report

DESCRIPTORS: *Gravity, *Marine geophysics, Ice islands, Depth finding, Meteorological parameters, Mapping.

AD-298 047 Div. 2
(TISTB/AW) OTS price $2.60

Geophysical and Polar Research Center, U. of Wisconsin, Madison.
GRAVITY AND MAGNETIC OBSERVATIONS FROM ICE ISLAND ARLIS-II, 1 JULY TO 6 OCTOBER, 1961, by Stephen L. Den Hartog and Ned A. Ostenso. Sep 62, 26p. (Research rept. no. 62-7; Contribution no. 90)
(Contract Nonr-120216)
Unclassified report

DESCRIPTORS: *Gravity, *Marine geophysics, *Terrestrial magnetism, Ice islands, Depth finding, Meteorological parameters, Mapping.

AD-298 113 Div. 2
(TISTP/FR) OTS price $17.00

Stanford Research Inst., Menlo Park, Calif.
THE USE OF SYNOPTIC-SCALE WEATHER RADAR OBSERVATIONS IN THE INTERPRETATION OF SATELLITE CLOUD OBSERVATIONS.
Final rept., by R. E. Nagle and R. H. Blackmer, Jr. Dec 62, 266p.
(Contract AF 19(628)284, SRI Proj. no. 3947)
(AFCRL 63-223) Unclassified report

Original contains color plates; all ASTIA reproductions will be in black and white. Original may be seen in ASTIA Hq.

DESCRIPTORS: *Clouds, *Atmospheric precipitation, Meteorological satellites, Aerial photographs, Meteorological radar, Photographs, Photographic interpretation.

3. CHEMICAL WARFARE EQUIPMENT AND MATERIALS

AD-297 048 Div. 3, 30, 16
(TISTB/JB) OTS price $1.60

Army Chemical Research and Development Labs., Army Chemical Center, Md.
JOURNAL ARTICLES JANUARY-DECEMBER 1961.

by Electa P. Skenzick. July 62, 16p. 47 refs.
(CRDL Special pub. no. 4-39)
Unclassified report

DESCRIPTORS: *Reports, Scientific research.

AD-297 224 Div. 3, 16
(TISTB/AW) OTS price $2.60

Pitman-Dunn Labs. Group, Frankford Arsenal, Philadelphia, Pa.
PROPELLANT ACTUATED DEVICE FOR PERCUTANEOUS INOCULATION,
by Charles J. Litz, Jr. Oct 62, 25p. incl. illus. table, 3 refs. (Rept. no. R-1656)
(DA Proj. 5S02-06-001)
Unclassified report

Original contains color plates: all ASTIA reproductions will be in black and white. Original may be seen in ASTIA Hq.

DESCRIPTORS: *Injection (Medicine), Automatic, Chemical warfare, Atropine, Cartridges (PAD).

A study was made to determine the feasibility of using the energy of propellant to perform a percutaneous inoculation (administer medication through the skin without an incision). A PAD percutaneous unit was designed, fabricated, and tested in the laboratory. This unit was 3-3/8 inches long by 7/8 inches diameter. It was powered by a modified T14E2 electric ignition element, and used a 0.0051 inch diameter sapphire nozzle. Twenty firings were made in the laboratory, demonstrating the feasibility of this PAD percutaneous inoculator. It is recommended that continued studies and testing be performed to perfect and make available an automatic PAD percutaneous inoculation unit for field use. (Author)

AD-297 999 Div. 3
(TISTM/BRW) OTS price $1.60

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
RADIOMETRIC DETERMINATION OF HOMOGENEITY OF A MULTICOMPONENT PYROTECHNIC MIXTURE,
by Richard J. Graybush and Thomas C. Castorina. Feb 63, 20p. (Technical rept. no. 3057)
(DA proj. 599-04-001)
Unclassified report

DESCRIPTORS: *Pyrotechnics, Solids, Powders, Mixtures, Barium compounds, Nitrates, Magnesium, Powder metals, Radiometers, Processing.

4. CHEMISTRY

AD-297 035 Div. 4
(TISTM/ODN) OTS price $.75

Harvard U., Cambridge, Mass.
INVESTIGATIONS IN THE FIELD OF SILICON-NITROGEN COMPOUNDS, INCLUDING POLYMERS.
Technical rept.,
by Dieter Kummer. Jan 63, 26p. incl. tables, refs.
(Contract Nonr-186613)
Unclassified report

DESCRIPTORS: *Silicon compounds, *Nitrogen compounds, *Polymers, Nuclear magnetic resonance, Polymerization, Molecular structure, Chlorides, Synthesis (Chemistry).

AD-297 054 Div. 4, 25, 2
(TISTP/MB) OTS price $8.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
THE SPECTRAL ABSORPTION COEFFICIENT OF HEATED AIR.
Technical rept.,
by D. R. Churchill, S. A. Hagstrom and others. Nov 62, 1v. incl. illus. tables, 29 refs. (Rept. no. 2-57-62-2)
(Contract DA 49-146-xz-009)
(DASA-1348) Unclassified report

DESCRIPTORS: *Absorption spectrum, Absorption, Line spectrum, Band spectrum, Molecular spectroscopy, Transport properties, Equations of state, Thermodynamics, Oxygen, Nitrogen, Ions, Oxides, Nitrogen compounds, Nuclear explosion, Hydrodynamics, Theory, Intensity, Air.

That portion of the line absorption coefficient for heated air which depends only on the molecular band systems, i.e., not on population numbers, has been calculated for each line in the frequency region of interest, with a total of over 150,000 lines tabulated on magnetic tape. With the results for the O2 Schumann-Runge system, a preliminary transport calculation has been completed for a slab of molecular oxygen. The effect of line widths on transmission is illustrated, and average transmissions are given as a function of frequency. The present results are compared with those of a previous calculation. (Author)

AD-297 177 Div. 4, 20, 25
(TISTM/EJH) OTS price $1.50

Monsanto Research Corp., Dayton, Ohio.
RADIATION POLYMERIZATION OF ACETYLENE DERIVATIVES.
Final rept., 10 Aug 61-10 Aug 62,
by M. E. Gutzke and W. H. Yanko. 22 Aug 62, 49p. incl. illus. tables.
(Contract NObs-86072)
Unclassified report

DESCRIPTORS: *Polymers, *Organic compounds, *Polymerization, *Semiconductors, Radiation chemistry, Gamma rays, Synthesis (Chemistry), Molecular structure, Electrical properties, Resistance (Electrical), Sensitivity.

Exploratory research on the radiation-induced polymerization of acetylene derivatives to produce polyene polymers with useful properties included synthesis of acetylene derivatives, screening monomers for radiation sensitivity, correlation of chemical structure with sensitivity, attempts to establish optimum polymerization conditions, and characterization of the products. A total of 48 acetylene derivatives were screened for radiation sensitivity during the year. Radiation yields with G values greater than 100 were observed with propiolic acid, G = 322; 2-butyn-1,4-dipropiolate, G = 103; neopentylene dipropiolate, G = 177; and pentaerythritol tetrapropiolate, G = 113. Other moderately radiation sensitive systems include: phenylpropiolic acid, G = 73; phenylbromoacetylene, G = 94; 2-butyn-1,4-diacetate, G = 96 and bis-1,4-(hydroxyethyloxy)-butyne-2, G = 57. (G value = number of monomer molecules that polymerize per 100 ev of radiation). In general, the acetylenic monomers exhibit good radiation sensitivity, but the products obtained appear to be of low molecular weight. Among the functional groups affecting radiation sensitivity, the carboxyl group appeared especially sensitive. Monopropiolates were fairly radiation-sensitive; all polypropiolate esters studied were very radiation sensitive. (Author)

Division 4 - CHEMISTRY

AD-297 198 Div. 4, 25
(TISTM/ODN) OTS price $1.10

American U., Washington, D. C.
CAVITATION INTENSITY MEASUREMENTS BY CHEMICAL MEANS.
Final rept.,
by Alfred Weissler. 1962, 2p.
(ONR Grant Nonr(G)-00055-62)
Unclassified report

DESCRIPTORS: *Cavitation, *Ultrasonic radiation, Colorimetric analysis, Chlorine, Carbon compounds, Chlorides, Test methods, Measurement, Cleaning.

AD-297 365 Div. 4, 14
(TISTM/ODN) OTS price $1.60

Material Lab., New York Naval Shipyard, Brooklyn.
SYNTHESIS OF THERMALLY STABLE SILARYLENE POLYMERS.
Progress rept. no. 8, Jan 60-July 62,
by A. D. Delman and J. Mironov. 27 Feb 63, 14p. incl. illus. tables (Lab proj. 6135)
(Subproj. R-007-03-03)
Unclassified report

DESCRIPTORS: *Heat-resistant plastics, *Polymers, *Silicone plastics, *Organic compounds, Aging (Materials), Metalorganic compounds, Chemical reactions, Aluminum compounds, Titanium compounds, Iron compounds, Oxides, Lead compounds, Chlorides, Bibliographies, Molecular structure, Synthesis (Chemistry).

Significant advances were achieved in the development of thermally stable semi-inorganic polymers with potentially useful end-item characteristics. Techniques are described for the synthesis of novel silarylene polymers and monomers showing pyrolytic resistance far superior to that exhibited by commercially available macromolecular substances. Linear and cyclic silbiphenylene polymers prepared in this program show weight losses when heated at 180 C/hr to 500 C of approximately 13 and 18%, respectively, as compared to that shown by commercial dimethylpolysiloxane gum which is completely volatilized at 350 C when sililarly treated. In addition, results of exploratory curing processes are given which indicate the potential suitability of FeCl3 and a mixture consisting of benzoyl peroxide and cobalt naphthenate as curing agents for a perphenylated polysiloxane and a linear silbiphenylene polymer, respectively. Additional crosslinking mechanisms will be investigated to further improve thermal stability of the polymeric products without sacrifice of engineering properties. (Author)

AD-297 407 Div. 4
(TISTM/BRW) OTS price $1.10

Ohio State U. Research Foundation, Columbus.
THE MECHANISM OF OXIDE FORMATION IN THE INITIAL STAGES OF OXIDATION.
Quarterly rept. no. 10, 1 Oct-31 Dec 62,
by D. W. Rausch, K. L. Moazed, and M. G. Fontana. 19 Feb 63, 4p. incl. table.
(Contract DA 33-019-ORD-3387, Proj. 2734-C)
Unclassified report

DESCRIPTORS: *Tungsten, *Oxygen, High temperature research, Low pressure research, Crystal structure, Adsorption, Field emission, Nucleation, Oxides, Tungsten compounds, Oxidation, Chemical reactions.

Work consisted primarily of further experimental studies of the reaction of oxygen on tungsten at temperatures between room temperature and 1000 C with oxygen pressure between 10 to the -8th power and 10 to the -4th power mm Hg. From this work has evolved a general description of the oxidation process on tungsten in terms of the more influential parameters of substrate temperature, crystallography, and oxygen pressure. (Author)

AD-297 435 Div. 4, 2
(TISTB/AW) OTS price $8.10

Texas A. and M. Coll., College Station.
THE RESISTANCE OF RECENT MARINE CARBONATE SEDIMENTS TO SOLUTION,
by John F. Jansen, Yasushi Kitano and others. 1963, 70p. incl. illus. tables, 7 refs. (Reference no. 62-18-T)
(Contract Nonr-211904, Proj. 083-036; NSF Grant no. G-24892)
Unclassified report

DESCRIPTORS: *Calcite, *Carbonate minerals, *Carbonates, Sea water, Sedimentation, Particle size, Crystal structure, Impurities, Magnesium compounds, pH, Water, Stability, Calcium compounds, Solubility.

The effect of the particle size, mineralogy and chemical composition of recent marine carbonate sediments on their resistance to solution in the ion pairs of sea water and distilled water was determined. The polymorphs of calcium carbonate investigated are calcite and aragonite. Seidell (1940) showed that the difference in solubility between those polymorphs is associated with their difference in crystal form. The most stable polymorph of calcium carbonate is calcite. Calcite is known to be more resistant to solution than aragonite; however, co-existing material or impurities in the crystal structures of calcium carbonate greatly affects its solubility. Chave (1954) and Kitano and Furutsu (1959) have shown that magnesium, the major impurity in marine carbonates, exists in the calcite crystal structure as a solid solution series between calcite and dolomite, and that as the magnesium content increases in the solid solution series, the solubility of calcite eventually becomes greater than aragonite. As magnesium exists in the calcite crystal form and is incompatible with aragonite (Chave, 1954), the crystal form of calcium carbonate, as well as the availability of magnesium, exerts a major control on the solution of carbonates in nature. (Author)

AD-297 475 Div. 4, 25
(TISTM/EJH) OTS price $13.00

Marquardt Corp., Van Nuys, Calif.
LITERATURE SURVEY OF THE KINETICS OF THE H-O-N SYSTEM,
by George E. Ellis. Nov 62, 184p. (Memo. rept. no. MR 20202)
(Contract AF 33(657)8491, Proj. 275)
Unclassified report

DESCRIPTORS: *Kinetic theory, *Gases, *Nitrogen compounds, *Oxygen compounds, *Hydrogen compounds, *Reaction kinetics, Dissociation, Gas ionization, Thermodynamics, Thermochemistry, Chemical reactions, Recombination reactions, Tables, Bibliography, Jet propulsion.

AD-297 537 Div. 4
(TISTM/ODN) OTS price $1.60

Rutgers U., New Brunswick, N. J.
(No title).
Annual rept. no. 1, 1 Sep 61-31 Aug 62,
by Marvin L. Granstrom. 31 Aug 62, 13p.
(Grant DA-CML-18-108-61-G26)
Unclassified report

DESCRIPTORS: *Chlorine compounds, *Solutions, *Sodium compounds, Buffers, pH, Phosphates, Potassium compounds, Chemical equilibrium, Reaction kinetics, Absorption, Dioxides, Preparation, Chlorites.

AD-297 811 Div. 4, 25
(TISTM/EJH) OTS price $6.60

Plastics Lab., Princeton U., N. J.
ELECTRONIC PROPERTIES AND STRUCTURE IN CONJUGATED POLYMERIC SYSTEMS,
by R. P. Chartoff and C. Cappas. 15 Feb 63, 37p. tables. (Technical rept. no. 66D)
(Grant DA 31-124-ARO(D)-21)
Unclassified report

DESCRIPTORS: *Polymers, *Semiconductors, *Molecular structure, *Organic compounds, Magnetic properties, Electrons, Spin, Resonance, Resistance (Electrical), Infrared spectroscopy, Paramagnetic resonance, Thermoelectricity, Electrical properties.

AD-297 824 Div. 4, 13
(TISTM/ODN) OTS price $3.50

Naval Research Lab., Washington, D. C.
A FIELD EVALUATION OF TERMITE REPELLENTS - PART 2,
by F. T. Brannan, J. D. Bultman, and J. M. Leonard. 22 Jan 63, 8p. (NRL rept. no. 5883)
Unclassified report

DESCRIPTORS: *Isoptera, *Insecticides, *Wood, *Pesticides, Protective treatments, Tests, Preservation.

AD-297 826 Div. 4
(TISTM/EJH) OTS price $1.10

Ohio State U. Research Foundation, Columbus.
METAL COMPLEXES OF POLYFUNCTIONAL 2-AMINOTHIOLS.
Quarterly rept., 1 Oct 62-1 Jan 63,
by Daryle H. Busch. 1 Jan 63, 3p.
(Contract DA 49-193-md-2104)
Unclassified report

DESCRIPTORS: *Metalorganic compounds, *Complex compounds, *Nickel compounds, Palladium compounds, Sulfur compounds, Chemical reactions, Solubility, Organic solvents, Magnetic properties, Water, Synthesis (Chemistry).

AD-297 860 Div. 4
(TISTT/TL) OTS price $1.60

Fritz-Haber-Institut de Max-Planck-Gesellschaft (Germany).
THE DEPENDENCE OF THE 2ND VIRIAL COEFFICIENT ON THE CONSTITUTION OF THE ENDGROUP OF THE MACROMOLECULES.
Final technical rept., Sep 61-Dec 62,
by K. Ueberreiter. Dec 62, 16p.
(Contract DA 91-591-EUC-1826)
Unclassified report

DESCRIPTORS: *Polymers, *Styrene plastics, *Molecular structure, Thermodynamics, Solutions, Configuration, Molecular weight, Differential equations, Test methods, Osmotic pressure.

AD-297 918 Div. 4, 7, 14, 17
(TISTM/ODN) OTS price $3.60

General Electric Co., West Lynn, Mass.
SEMICONDUCTING COMPOUNDS FOR THERMOELECTRIC POWER GENERATION.
Final rept., 1 July-30 Sep 62,
by R. Bobone, L. F. Kendall, and R. H. Vought. 30 Sep 62, 31p.
(Contract DA 44-177-tc-639)
(TCREC Tech. rept. 62-112)
Unclassified report

DESCRIPTORS: *Intermetallic compounds, *Semiconductors, *Thermoelectricity, Chemical compounds, Copper compounds, Tin compounds, Sulfides, Germanium compounds, Alloys, Magnesium alloys, Tin alloys, Germanium alloys, Synthesis (Chemistry), Silicon alloys, Lead alloys, X-ray diffraction analysis, Thermal conductivity, Gallium compounds, Indium compounds, Antimony compounds, Bismuth compounds, Silver compounds, Lead compounds, Materials.

AD-297 993 Div. 4, 25
(TISTM/EJH) OTS price $1.10

Mallinckrodt Chemical Lab., Harvard U., Cambridge, Mass.
PROPYLENE SULFIDE,
by Samuel S. Butcher. 1962, 6p.
Unclassified report

DESCRIPTORS: *Organic compounds, *Microwave spectroscopy, *Molecular spectroscopy, Infrared spectroscopy, Quantum mechanics, Excitation, Vibration, Electron transitions.

AD-298 037 Div. 4
(TISTM/RGR) OTS price $1.60

Louisiana State U., Baton Rouge.
COULOSTATIC ANODIC STRIPPING WITH A MERCURY ELECTRODE,
by Akiko Aramata and Paul Delahay. Feb 63, 10p.
(Technical rept. no. 52)
(Contract Nonr-157504, Proj. NR 051-258)
Unclassified report

DESCRIPTORS: *Quantitative analysis, *Polarographic analysis, *Zinc, Laboratory equipment, Electrical equipment, Electrochemistry.

AD-298 136 Div. 4, 30, 32
(TISTM/EJH) OTS price $13.50

Office of Aerospace Research, Washington, D. C.
CHEMISTRY PROGRAM REVIEW.
Rept. for Fiscal Year 1962,
ed. by Alfred Weissler, William H. Wyatt, and Orville Rollins. 15 Dec 62, 187p. incl. illus. tables.
Unclassified report

Original contains color plates; all ASTIA reproductions will be in black and white. Original may be seen in ASTIA Hq.

DESCRIPTORS: *Air force research, *Chemistry, *Research program administration, Photochemistry, Space environmental conditions, Radiation damage, Materials, Solid state physics.

The annual Chemistry Program Review has several purposes. One is to provide a unified record of the research in progress and the achievements. Another is as part of a feedback loop, for evaluation purposes. A third aim, is to speed up the dissemination of the new basic ideas and information produced on the frontiers of

chemical research. The Review consists of 3 main parts. For each project which was completed during fiscal year 1962, a concise factual summary (including administrative data as well as research accomplishments) is provided. A second part contains geographic and other program statistics, a list of all scientific reports received during the year, and a list of the active projects. Research highlights and items of special interest are reported in the first part of the review. (Author)

5. COMMUNICATIONS

AD-297 068 Div. 5
(TISTP/JW) OTS price $13.50

Ohio State U. Research Foundation, Columbus.
AN INTERFEROMETRIC-MODULATION ORDER-SEPARATOR FOR A FAR INFRARED SPECTROGRAPH,
by Miles Elliot Vance. Sep 62, 185p. incl. illus. tables, refs. (Scientific rept. no. 3)
(Contract AF 19(604)4119, Proj. 8603)
(AFCRL 62-1008) Unclassified report

DESCRIPTORS: *Infrared spectroscopy, *Interferometers, Theory, Mathematical analysis, Infrared detectors, Radiation effects, Beams (Electromagnetic), Waveguides, Integral transforms, Harmonic analyzers, Frequency, Instrumentation, Modulation.

AD-297 230 Div. 5, 8
(TISTE/OHD) OTS price $2.60

Rome Air Development Center, Griffiss Air Force Base, N. Y.
THE APPLICATION OF TUNNEL DIODES TO A REFLECTING ANTENNA ARRAY,
by James R. Forgione, Edward J. Calucci, and Charles M. Blank. Jan 63, 19p. incl. illus.
(Rept. no. RADC TDR 63-4)
(Proj. 5519)
Unclassified report

DESCRIPTORS: *Diodes (Semiconductor), *Microwave amplifiers, *Dipole antennas, Feasibility studies, Communication satellites (Active), Mathematical analysis, Stability, Circuits, S band, Negative resistance circuits.

The feasibility at microwave frequencies of enhancing the reflectivity from a two-element array of broadband coaxial dipoles, each terminated by tunnel diode reflection amplifiers without the use of stabilization networks, was demonstrated. Theoretical analysis of a reflection amplifier is presented along with experimental results of the two-element array at S band. (Author)

AD-297 248 Div. 5, 8, 32
(TISTP/MB) OTS price $9.10

Litton Systems, Inc., Waltham, Mass.
OPTIMUM SPEECH SIGNAL MAPPING TECHNIQUES.
Final rept.,
by W. B. Floyd. 30 Nov 62, 96p. incl. illus. tables, 12 refs.
(Contract AF 30(602)2641, Proj. 4027)
(RADC TDR 62-598) Unclassified report

DESCRIPTORS: *Speech representation, *Speech, Language, Communications theory, Signals, Transformations (Mathematics), Data processing systems, Spectrum analyzers, Analysis, Pattern recognition, Synthesis.

The problem of representing speech signals in a format which will facilitate automatic speech transcription has been investigated. The method of representation selected for experimental study involves the transformation of speech signals into sequences of periodically sampled outputs of speech parameter extractors, i.e., devices designed to extract clues from speech signals which will serve to identify the language element being uttered. Automatic extractors have been constructed and data has been collected to ascertain the degree to which speech sounds can be identified properly, using several parameters reflecting the location of formants and spectral shape information. Methods of completing the transformation, or transcription, of speech into sequences of language elements suitable for presentation to a human reader have also been investigated. Test results indicate that the most easily instrumented transcription methods can be expected to yield readable transcriptions from the use of a small number of speech parameters. (Author)

AD-297 250 Div. 5, 30, 12
(TISTE/PCR) OTS price $1.60

Philco Corp., Palo Alto, Calif.
ENGINEERING PLAN GDHE/MUSAP COMMAND INTERFACE.
26 Feb 63, 10p. incl. illus. (Rept. no. WDL-TR2029)
(Contract AF 04(647)278)
Unclassified report

DESCRIPTORS: *Data processing systems, *Satellites (Artifical), Command and control systems, Design, Analog computers, Computer logic, Ground support equipment.

This engineering plan describes the equipment and modifications necessary to interface the existing Ground Data Handling Equipment (GDHE) with certain Multiple Satellite Augmentation Program (MUSAP) command equipment. (Author)

AD-297 355 Div. 5
(TISTE/OHD) OTS price $4.60

Aerospace Information Div., Washington, D. C.
COMMUNICATIONS NETWORKS. PART II. DESIGNATIONS AND ABBREVIATIONS.
28 Jan 63, 46p. (AID rept. no. P-63-16)
Unclassified report

DESCRIPTORS: *Communication systems, *Communication equipment, Dictionaries, Radio equipment, Telegraph equipment, Telephone equipment, Television equipment, Test equipment (Electronics), Directories.

AD-297 359 Div. 5
(TISTE/OHD) OTS price $4.60

Aerospace Information Div., Washington, D. C.
COMMUNICATIONS NETWORKS. PART I. REVIEW OF SOVIET LITERATURE.
25 Jan 63, 41p. incl. illus. tables, 49 refs.
(AID rept. no. P-63-15; Rept. no. 2)
Unclassified report

DESCRIPTORS: *Bibliographies, *Communication systems, Radio communication systems, Telephone communication systems, Telegraph systems, Voice communication systems.

AD-297 366 Div. 5
(TISTE/OHD) OTS price $4.60

Motorola, Inc., Chicago, Ill.
DATA TRANSMISSION INVESTIGATION.
Quarterly progress rept. no. 1, 11 Sep-10 Dec 62,
by J. J. Tsimbidis. 10 Dec 62, 1v. incl. illus.

tables (Rept. no. 5)
(Contract DA 36-039-sc-90728, Proj. 3B31-07-001; Continuation of Contract DA 36-039-sc-87343)
Unclassified report

DESCRIPTORS: *Data transmission systems, *Field wire communication systems, *Radio communication systems, *Voice communication systems, Digital systems, Errors, Signal-to-noise ratio, Frequency shift, Noise (Radio), Radio interference, Frequency-shift keyers, Phase modulation, Test facilities, Test methods, Path transmission systems, Data transmission systems.

Performance of the Di-Phase modem in the presence of white noise is evaluated at 150, 300, 600, and 1200 bps. White noise test results are also given for the Quad-Phase modem operating back-to-back and through tandem channels of the AN/TCC-7. Frequency translation and its effect upon the various modems is discussed. S/N performance curves for each modem for a constant frequency shift shows the loss in performance resulting from operating a modem over a system that exhibits frequency translation. Problems involved in using the AN/VRC-12 radio set in digital data transmission are discussed with recommended input/output connections and levels for various modes of operation. Use of the AN/VRC-12 in an automated data system is discussed with special treatment given to automatic on-off control of the transmitter. Field cable test results are presented in tabulated form and are briefly discussed. Results obtained from full duplex operation of two Di-Phase modems operating over the AN/TCC-7 cable system are given. The new data generator and correlator are discussed, and a block diagram of the system is presented. (Author)

AD-297 409 Div. 5, 8
(TISTE/OHD) OTS price $9.60

Philco Corp., Palo Alto, Calif.
INTERSTATION DATA. TRANSMISSION STUDY.
Final rept.
28 Feb 63, 1v. incl. illus. tables (Rept. no. WDL-TR2017)
(Contract AF 04(695)113)
Unclassified report

DESCRIPTORS: *Data transmission systems, *Digital systems, Telephone lines, Transmission lines, Radio communication systems, Scattering, Communication satellites (Active), Radio interference, Atmospherics, Propagation, Reliability (Electronics), Errors, Probability, Mathematical analysis, Feasibility studies, Communication theory.

The operational characteristics of equipment designed to transmit data through a single voice channel are summarized. Some of the characteristics that are summarized include: type of modulation, requirements placed on transmission medium, transmission rates, equalization provided, size, weight, prime power requirement, etc. The typical characteristics of the media through which data is transmitted are considered. Some of the media that are considered include: wire lines, HF radio, microwave line-of-sight, and the various scatter propagation techniques. The various types of equipment are rated in terms of maximum data transmission rate, reliability, error rate, and availability. These criteria can then be weighted in order to compare the over-all performance with the customer's needs. An example of this type of approach is given. When the allowable error rate is very small, coding is essential. Error detection and error correction for both white noise and burst error interference are considered. It is concluded that long word length codes (100-500 bits) with error detection is the most promising technique, but that a feedback path is required. (Author)

AD-297 728 Div. 5, 8
(TISTW/PCR) OTS price $1.10

General Dynamics/Electronics, Rochester, N. Y.
PASSIVE AURAL CLASSIFICATION GROUP.
Technical progress rept. no. 2, 22 Sep 62-22 Jan 63,
by J. F. Judson. 1963, 10p.
(Contract NObsr-87655)
Unclassified report

DESCRIPTORS: *Sound signals, Electronic equipment, Design, Production, Amplifiers, Oscillators, Mixers (Electronic), Power supplies, Audio amplifiers, Audiofrequency, Transformers, Circuits, Electric filters, Photographs, Classification.

AD-297 793 Div. 5
(TISTW/PCR) OTS price $11.50

National Cash Register Co., Hawthorne, Calif.
RESEARCH ON MAGNETIC ROD STORAGE AND CONTROL UNITS FOR A SWITCHING CENTRAL OFFICE INCORPORATING ADDENDUM MATERIAL.
Final progress rept., 15 Apr 61-31 Oct 62,
by D. Rork and P. Ellinger. 31 Oct 62, 142p.
(Rept. nos. 4 and 5)
(Contract DA 36-039-sc-87212)
Unclassified report

DESCRIPTORS: *Switching circuits, *Telephone communication systems, Telephone equipment, Magnetic core storage, Control systems, Digital systems, Computer logic, Theory, Telephone lines, Command & control systems, Field wire communication systems, Wiring diagrams, Design, Combat information centers.

AD-297 798 Div. 5, 8
(TISTW/PCR) OTS price $.50

Michigan U., Ann Arbor.
SWEPT FREQUENCY MODULATION. A MEANS OF REDUCING THE EFFECTS OF IMPULSE NOISE.
Report on Telemetry and Command Destruct,
by John C. Dute and Chester A. Hines. Dec 62, 19p.
(Contract AF 33(616)7915, Proj. 4107)
(ASD TDR 62-836) Unclassified report

DESCRIPTORS: *Telemeter systems, *Telemetering receivers, Noise (Radio), Data transmission systems, Analog systems, Optical equipment, Monochromatic light, Diffraction gratings, Digital systems, Frequency modulation.

AD-297 812 Div. 5
(TISTB/AW) OTS price $4.60

CBS Labs., Stamford, Conn.
STUDY OF INCORPORATION OF SOUND ON TRANSPARENCY,
by Benjamin B. Bauer, George W. Sioles, and Arnold Schwartz. Nov 62, 41p.
(Contract N61339-1084)
(NAVTRADEVCEN TR-1084-1) Unclassified report

DESCRIPTORS: *Sound reproduction systems, *Display systems, *Training devices, Optical equipment, Magnetic recording systems, Speech representation, Signal-to-noise ratio, Reliability, Costs.

AD-297 950 Div. 5
(TISTW/RD) OTS price $6.60

General Electric Co., Syracuse, N. Y.
TRANSPORTABLE PASSIVE SATELLITE COMMUNICATIONS TERMINAL.
Final technical rept.,
by R. W. Kille, N. R. Powell and others. Jan 63, 151p.
(Contract AF 30(602)2603, Proj. 4519)
(RADC TDR 62-502) Unclassified report

DESCRIPTORS: *Communication satellites (Passive), *Communication equipment, Mobile, Ground vehicle antennas, Trailers, Radio towers, Towers, Optical equipment, Optical tracking, Antenna components, Parametric amplifiers, Antenna feeds, Antenna radiation patterns, Power amplifiers.

AD-297 956 Div. 5, 8
(TISTE/OHD) OTS price $2.60

Electronic Defense Lab., Mountain View, Calif.
TWO METHODS FOR SYNCHRONIZING R-390 RECEIVERS,
by Michael Halus. 7 Nov 62, 18p. (Technical memo. no. EDL-M509)
(Contract DA 36-039-sc-87499)
Unclassified report

DESCRIPTORS: *Radio receivers, High frequency, Crystal oscillators, Circuits, Oscillators, Synchronization (Electronics).

AD-298 114 Div. 5
(TISTP/FR) OTS price $1.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
ERROR STATISTICS AND CODING FOR DIGITAL DATA TRANSMISSION OVER TELEPHONE AND TELETYPE CIRCUITS,
by A. Burr Fontaine. 21 Jan 63, 12p.
(Contract AF 19(628)500)
(AFESD TDR 63-22) Unclassified report

DESCRIPTORS: *Telegraph signals, *Errors, Teletype systems, Radio teletype systems, Data transmission systems, Telephone lines, Microwave communication systems.

AD-298 118 Div. 5, 8
(TISTW/PCR) OTS price $9.10

Georgia Inst. of Tech., Engineering Experiment Station, Atlanta.
COMMUNICATIONS INTERFERENCE REDUCTION STUDY.
Final rept.,
by W. B. Warren, Jr. 3 Dec 62, 92p.
(Contract AF 30(602)2399, Proj. A-525)
(RADC TDR 62-631) Unclassified report

DESCRIPTORS: *Radio interference, Radio communication systems, Measuring devices (Electrical and electronic), Electromagnetic pulses, Continuous wave radar, Limiters, Radiofrequency, Radiofrequency pulses, Radiofrequency amplifiers, Mixers (Electronic), Diodes, Audiofrequency, Band-pass filters, Radio receivers, Gates (Circuits), Electronic switches, Design, Capacitors, Resonance, Circuits, Parametric amplifiers, Ultrahigh frequency, Reduction.

AD-298 133 Div. 5
(TISTW/JEA) OTS price $4.60

National Aviation Facilities Experimental Center, Atlantic City, N. J.
EXPERIMENTATION ON IMPROVED GROUND EQUIPMENT FOR 50-KC VOR CHANNEL SPACING.
Final rept.,
by J. E. Blazej. May 62, 36p.
(Proj. 115-9-8X)
Unclassified report

DESCRIPTORS: *Radio communication systems, *Radio interference, *Sidebands, Radiofrequency amplifiers, Radiofrequency interference, Radiofrequency pulses, Very high frequency, Radio signals, Radio receivers, Instrumentation, Spectrum analyzers, Airborne, Aircraft, Flight testing, Sources, Audiofrequency.

6. DETECTION

AD-297 014 Div. 6, 12
(TISTA/VGW) OTS price $11.50

Philco Corp., Palo Alto, Calif.
PROGRAM PLAN FOR MULTI-SATELLITE AUGMENTATION, PHASE B-2 (FGS AND TTS).
18 Feb 63, 151p. incl. illus. tables (Rept. no. WDL-TR2024)
(Contract AF 04(695)278)
Unclassified report

DESCRIPTORS: *Satellites (Artificial), *Radar stations, Construction, Electronic equipment, Data processing systems, Display systems, Research program administration, Scheduling, Test methods, Buildings, Specifications, Radar tracking, Command and systems control, Tracking, Telemeter systems, Instrumentation.

AD-297 016 Div. 6, 8, 12
(TISTW/PCR) OTS price $6.60

Philco Corp., Palo Alto, Calif.
SATELLITE CONTROL SUBSYSTEM PROGRAM PROGRESS, FACILITIES PROGRESS, AND SECURITY.
Contract status rept., 1-31 Jan 63.
20 Feb 63, 1v. incl. illus. tables (Rept. no. WDL-TR2013)
(Contracts AF 04(647)532, AF 04(647)829 and others)
Unclassified report

DESCRIPTORS: *Satellites (Artificial), *Space surveillance systems, Radar stations, Doppler radar, Design, Calibration, Ground support equipment, Radar beacons, S band, Human engineering, Reliability, Space communication systems, Ultrahigh frequency, Power amplifiers, Traveling wave tubes, Radio transmitters, Radio receivers, Simulation, Radar antennas, Radomes, Display systems, Data processing systems, Control systems, Radar tracking.

AD-297 017 Div. 6, 8
(TISTW/PCR) OTS price $2.60

Philco Corp., Palo Alto, Calif.
PROGRAM 823 PROGRESS AND SECURITY.
Contract status rept. 1-31 Jan 63.
20 Feb 63, 15p. incl. illus. tables (Rept. no. WDL-TR2014)
(Contract AF 04(695)113)
Unclassified report

DESCRIPTORS: *Space surveillance systems, Radar stations, Telemeter systems, Data processing systems, Display systems, Calibration, Communication systems, Doppler radar, Design, Reliability, Radar tracking.

AD-297 047 Div. 6
(TISTW/JEA) OTS price $7.60

Armour Research Foundation, Chicago, Ill.
APPLICATION OF OPERATIONS RESEARCH TO INTERFERENCE.
Technical note no. 1, 9 Apr-9 Oct 62, by Bernhard Ebstein. Oct 62, 64p. incl. illus. tables, 8 refs. (Rept. no. ARF 5177-TN-1)
(Contract AF 30(602)2667, Proj. 4540)
(RADC TDR 62-550) Unclassified report

DESCRIPTORS: *Radar interference, *Interference analyzers, Linear programming, Microwave networks, Antenna radiation patterns, Radar transmitters, Measurement, Radar receivers, Radiofrequency interference, Search radar, Combinatorial analysis, Mathematical prediction, Digital computers, Programming (Computers), Radar pulses, Operations research, Radar equipment, Control, Test methods, L band.

Work performed during the first six months of the program encompassing a review of several interference control methods and optimization techniques; selection of a control method for further investigation; development of applicable optimization techniques; and the design of a field test to check the assumptions and input data accuracies required for the control method is presented. Controlling the operational parameters of frequency, transmitter power, geographical location and antenna orientation has been considered, with frequency assignment the interference control method selected for further study. The mathematical tools investigated in relation to their applicability to the control methods considered are linear programming dynamic programming, and network and combinatorial search techniques. Emphasis is placed on radar interference problems and a field test using three L-band radars is described. Sample interference minimization problems with frequency as the controlled factor are presented, as well as the data available from the initial portions of the field test. (Author)

AD-297 096 Div. 6
(TISTW/JEA) OTS price $1.60

Army Missile Command, Redstone Arsenal, Huntsville, Ala.
POWER AND SIGNAL-TO-NOISE CALCULATIONS OF A CERTAIN PSEUDO-RANDOM SIGNAL,
by Eugene J. McManus, Jr. 25 Jan 63, 16p. incl. illus. 3 refs. (Rept. no. RE-TR-63-1)
(DA Proj. 1-A-0-13001-A-039)
Unclassified report

DESCRIPTORS: *Amplifiers, *Signal-to-noise ratio, *Radar signals, *Spectrum analyzers, Functions, Fourier analysis, Correlation techniques, Integral transforms, Power.

Calculations of power and spectral distribution for a particular pseudo-random waveform are presented. Signal-to-noise ratios are derived, and it is shown that the amplifier bandwidth which maximizes the output signal-to-noise ratio is given by 2/tau, when tau is the bit length in the pseudo-random sequence. (Author)

AD-297 338 Div. 6, 8
(TISTE/OHD) OTS price $5.60

Navy Electronics Lab., San Diego, Calif.
SIMULTANEOUS MULTIBEAM PHASE COMPENSATION. XI. A RESISTIVE-ELEMENT PHASE COMPENSATOR,
by L. D. Morgan and R. D. Strait. 4 Dec 62, 48p. incl. illus. 18 refs. (NEL rept. no. 1148)
Unclassified report

DESCRIPTORS: *Sonar equipment, *Scanning sonar, Phase transformers, Resistors, Corrections, Phase shifters.

A single-beam, resistive-element phase compensator network was designed and constructed for the 48-element array of the AN/SQS-4 Mod 3 sonar with half-wavelength spacing. It demonstrated satisfactory operation throughout the frequency range within plus or minus 17% of the design frequency, yielding beam patterns similar to the transformer phase compensator patterns obtained in the same way. Theory and design details are discussed fully. (Author)

AD-297 402 Div. 6, 2
(TISTE/OHD) OTS price $3.60

Naval Ordnance Lab., White Oak, Md.
ACOUSTIC EFFECTS OF MARINE FOULING ON TRANSDUCERS,
by R. J. Urick. 21 Nov 62, 11p. illus. (Rept. no. NOLTR 62-185)
Unclassified report

DESCRIPTORS: *Hydrophones, *Fouling, *Transducers (Acoustic), Marine biology, Algae, Acoustic properties, Acoustic ranges, Test facilities, Tests, Sensitivity, Underwater sound equipment.

Underwater objects always acquire a growth of marine organisms when left in the water for a period of time. When a natural growth of fouling occurs on a hydrophone, a reduction of its sensitivity and a deterioration of its beam pattern may be expected. In order to estimate the severity of these effects, a small selection of hydrophones were measured after they had remained in Chesapeake Bay during the growing season of 1961. Measurements of beam pattern and receiving response were made in the fouled condition and after the fouling had been cleaned off. Reductions of axial sensitivity ranging from zero to 10 db were found in the frequency interval 1 to 20 kc. Appreciable, though not severe, effects of the fouling on the hydrophone beam patterns were observed. Additional work is needed for making prediction estimates for surveillance systems or other uses. (Author)

AD-297 410 Div. 6
(TISTA/FRL) OTS price $6.60

Philco Corp., Palo Alto, Calif.
PROGRAM TEST PLAN FOR MULTIPLE SATELLITE AUGMENTATION-PHASE A.
Technical operating rept.
28 Feb 63, 1v. incl. tables (Rept. no. WDL-TR2015)
(Contract AF 04(695)278)
Unclassified report

DESCRIPTORS: *Tracking, *Satellites (Artificial), Tests, Timing devices, Radar equipment, Antennas, Telemeter systems, Data processing systems, Analysis, Ground support equipment, Radar tracking.

This report outlines the types and preferred sequence of tests for the Multiple Satellite Augmentation Program (MSAP) Phase A equipment configuration and applies to component testing through Phase IV A Testing, which is conducted on subsystems. Phase III and Phase IV A tests as specified in this plan apply to Thule Tracking Station, New Hampshire Station, North Pacific Station, Vandenberg Tracking Station, and Hawaii Tracking Station where applicable. (Author)

Division 6 - DETECTION

AD-297 411 Div. 6
(TISTA/FRL) OTS price $4.60

Philco Corp., Palo Alto, Calif.
MULTIPLE SATELLITE AUGMENTATION PROGRAM TRACKING STATION COMPUTER OPERATIONAL PROGRAMS (MILESTONES 2 AND 3).
Technical operating rept.
28 Feb 63, 1v. incl. illus. (Rev. 1 to Rept. no. WDL-TR1931)
(Contract AF 04(695)177)
Unclassified report

DESCRIPTORS: *Tracking, *Satellite (Artificial), Tests, Timing devices, Radar tracking, Radar equipment, Communication systems, Analysis, Telemeter systems, Analog computers, Digital computers, Programming (Computers), Data processing systems.

This report describes data processing subsystem operational computer programs to be used at remote tracking sites in support of satellite acquisition, tracking, commanding, telemetry, and station control operations as required. (Author)

AD-297 414 Div. 6, 8
(TISTP/JW) OTS price $6.60

Philco Corp., Palo Alto, Calif.
DOPPLER PROPAGATION STUDY.
31 Jan 63, 61p. incl. illus. tables, 12 refs.
(Rept. no. WDL-TR1993)
(Contract AF 04(695)113)
Unclassified report

DESCRIPTORS: *Doppler systems, *Tracking, Atmospheric refraction, Errors, Measurement, Models (Simulations), Propagation, Signals.

Doppler propagation and the problems encountered in transmitting and receiving Doppler tracking signals through the atmosphere are described. Formulas are presented for the Doppler shift, models of the atmosphere, and equations for atmospheric refraction. The information is combined in an analysis of Doppler errors caused by propagation effects and indicates the accuracies to be expected when dealing with Doppler shifts. (Author)

AD-297 433 Div. 6, 19, 22
(TISTE/OHD) OTS price $1.10

Tellurometer (Pty) Ltd., Union of South Africa.
SHORT RANGE ELECTRONIC POSITIONING EQUIPMENT.
Appendix to the Final technical rept., Jan-Oct 62.
Oct 62, 8p. incl. illus. tables.
(Contract DA 44-009-eng-3811, Proj. 8-35-10-500)
Unclassified report

DESCRIPTORS: *Radio equipment, *Electronic equipment, Test methods, Low-temperature research, Coaxial cables, Hyperbolic navigation, Position finding, Surveying.

The COR1 equipment was cold-weather tested in the environmental chamber during January, 1962. Various faults brought on by the low-temperature conditions were cleared and the equipment was taken to Alaska for service tests in February, 1962. From these tests a great deal of useful information was obtained. The progress of the development was such that, with the prior permission, a demonstration could be given to the British army at the school of artillery, Larkhill, England, during July, 1962. Transmitters of model COR2 with control units, synchronizing receivers, and search receivers, of model COR1 were used. Concurrently with the trials in England, model-COR2 control units and synchronizing receivers were developed, and during September, 1962, full-scale field trials were carried out in the Malmesbury area of South Africa. After subsequent environmental tests, the equipment was despatched to the U.S.A. Field trials in northern Virginia and environmental trials were successfully carried out during October 1962. (Author)

AD-297 746 Div. 6, 25
(TISTW/RD) OTS price $1.60

Naval Ordnance Test Station, China Lake, Calif.
MEASUREMENTS OF REFLECTING PROPERTIES OF VARIOUS AIRCRAFT COATINGS WHEN ILLUMINATED BY A LASER,
by Stephen E. Barber, Gerald E. Holmberg, and Stuart J. Besser. Jan 63, 10p. (NOTS TP 3114) (NAVWEPS rept. no. 8084) Unclassified report

DESCRIPTORS: *Coatings, *Light pulses, *Lasers, Paints, Aircraft, Photomultipliers, Naval aircraft, Reflection, Ruby.

AD-297 841 Div. 6
(TISTA/FRL) OTS price $3.60

Oklahoma State U. Research Foundation, Stillwater.
ROCKET RESEARCH,
by Joseph B. Zinn. 28 Dec 61, 27p. (Scientific rept. no. 1)
(Contract AF 19(604)6648, Proj. P7659)
(AFCRL 62-1123) Unclassified report

DESCRIPTORS: *Telemetering receivers, Magnetic recording systems, Discriminators, Antennas, Oscillographs, Portable, Ground support equipment, Communications equipment.

AD-297 843 Div. 6
(TISTA/FRL) OTS price $4.60

Philco Corp., Palo Alto, Calif.
MILESTONE 6. MSAP TRACKING STATION OPERATIONAL COMPUTER PROGRAM ACCEPTANCE SPECIFICATION.
Technical operating rept.,
1 Mar 63, 1v. (Rept. no. WDL-TR2032)
(Contract AF 04(695)177)
Unclassified report

DESCRIPTORS: *Tracking, *Satellites (Artificial), Telemeter systems, Tests, Computers, Operation, Programming (Computers), Radar tracking, Radar stations, Ground support equipment, Data processing systems.

AD-297 877 Div. 6
(TISTW/RD) OTS price $17.00

Jansky and Bailey Div., Atlantic Research Corp., Washington, D. C.
INTERFERENCE ANALYSIS STUDY.
Interim summary, May-Dec 62.
Jan 63, 245p. incl. illus. tables, refs.
(Contract AF 30(602)2665)
(RADC TDR 63-37) Unclassified report

DESCRIPTORS: *Radar interference, Radar antennas, Crystal mixers, Radar duplexers, Waveguides, Radar receivers, Signal-to-noise ratio, Noise (Radar), Radar signals, Magnetrons, Radar transmitters, Mathematical prediction.

Emphasis during the current work is upon updating the interference prediction methods themselves and upon enlarging the range of available input functions so that an ever-increasing panorama of

interference situations may be considered. Particular emphasis is upon those potential interference problems associated with complexes containing large high-powered equipments. A continuous validation of the prediction methods and each of the inputs which are generated is a constant theme throughout the project. Attention is also directed toward formalization of the prediction methods which have been developed to date so that they may eventually be used by engineers in handbook fashion. (Author)

AD-297 922 Div. 6, 15
(TISTW/RD) OTS price $1.60

RAND Corp., Santa Monica, Calif.
SOME TOPICS IN SEQUENTIAL DETECTION AND ESTIMATION,
by Ivan Selin. Feb 63, 12p. (Rept. no. P-2711)
Unclassified report

DESCRIPTORS: *Sequential analysis, Radar signals, Radar equipment, Microwaves.

AD-297 934 Div. 6
(TISTW/RD) OTS price $4.60

System Development Corp., Santa Monica, Calif.
TECHNICAL DESCRIPTION OF GPS-T2 AND ACTER FOR SAGE STP,
by C. E. Smith. 21 Jan 63, 43p. (Technical memo. no. TM-971/000/00)
(Contract AF 19(628)1648)
Unclassified report

DESCRIPTORS: *Electronic counter-countermeasures, *Radar signals, *Radar target position, Antiaircraft defense systems, Programming (Computers), Data processing systems, Coding, Radar jamming, Electronic countermeasures, Training devices, Simulation, Aircraft.

AD-297 948 Div. 6
(TISTW/RD) OTS price $2.60

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
BIBLIOGRAPHY: RADIO TELEMETRY TO SURVIVE HIGH ACCELERATIONS,
comp. by P. L. Clemens. Feb 63, 24p. (Rept. no. AEDC TDR 63-36)
(Contract AF 40(600)1000, Proj. 8952)
Unclassified report

DESCRIPTORS: *Bibliographies, *Telemeter systems, Acceleration, Containers, Abstracts, Protective coverings, Instrumentation.

AD-297 951 Div. 6
(TISTP/FR) OTS price $3.60

Electronic Defense Labs., Mountain View, Calif.
SIGNAL DETECTION BY FINITE CORRELATION,
by Crosman Jay Clark. 28 Sep 62, 35p. (Technical memo. no. EDL-M489)
(Contract DA 36-039-sc-87475)
Unclassified report

DESCRIPTORS: *Radar signals, *Radio signals, *Correlation techniques, Multipath transmission, Sources, Functions, Detection.

AD-298 002 Div. 6, 25
(TISTE/OHD) OTS price $3.50

Boeing Co., Renton, Wash.
STUDY OF ADVANCED SOLID STATE INFRARED DETECTION.
Final rept., Sep 60-Nov 62,
by D. W. Nyberg, G. W. Flint and others. Nov 62, 229p. (Rept. no. D6-8896)
(Contract AF 33(616)7549)
(ASD TDR 62-977) Unclassified report

DESCRIPTORS: *Infrared research, *Infrared detectors, *Semiconductor devices, Single crystals, Ferroelectric crystals, Potassium compounds, Phosphates, Sulfates, Indium, Silicon, Low-temperature research, Cryogenics, Noise (Radio), Bolometers, Ionization, Germanium, Phonons, Acoustic properties, Cadmium compounds, Gallium compounds, Phosphides, Phosphorescent materials, Sulfides, Tellurides, Zinc compounds, Semiconductors.

AD-298 008 Div. 6
(TISTW/RD) OTS price $1.10

Operations Evaluation Group, Office of Naval Operations, Washington, D. C.
ESTIMATING THE LATERAL RANGE CURVE FROM OBSERVED DETECTION RANGES.
Interim research memo.,
by R. D. Arnold and J. Bram. 9 Nov 62, 8p.
(Rept. no. IRM-27)
Unclassified report

DESCRIPTORS: *Radar targets, *Sonar targets, *Ranges (Distance), Detection, Mathematical analysis, Measurement.

AD-298 126 Div. 6
(TISTW/JEA) OTS price $8.60

Naval Research Lab., Washington, D. C.
A GUIDE TO BASIC PULSE-RADAR MAXIMUM-RANGE CALCULATION. PART 1 - EQUATIONS, DEFINITIONS AND AIDS TO CALCULATION,
by L. V. Blake. 28 Dec 62, 93p. (NRL rept. no. 5868)
Unclassified report

DESCRIPTORS: *Ranges (Distance), *Radar signals, Radar pulses, Attenuation, Absorption, Atmosphere, Equations, Signal-to-noise ratio, Measurement.

7. ELECTRICAL EQUIPMENT

AD-297 026 Div. 7, 14
(TISTP/JW) OTS price $9.60

Spectrolab, Inc., North Hollywood, Calif.
INVESTIGATION OF OPTICAL COATINGS FOR SOLAR CELLS.
Technical summary rept. no. 2, 1 July-31 Dec 61,
by F. E. Fuller. 31 Dec 61, 117p. incl. illus. tables, 10 refs.
(Contract DA 36-039-sc-87449)
Unclassified report

DESCRIPTORS: *Solar cells, *Photoelectric cells (Semiconductor), Silicon, Optical filters, Design, Optical coatings.

Performance analyses of silicon cell solar power systems using radiation concentration and filtering have been obtained. Performance characteristics of silicon photovoltaic cells and filters have been studied with respect to the relation of their characteristics to the power system design and performance. Elementary conditions of system design for optimum performance have been established. The elements of plan have been outlined for the development of adequate methods

for the design and performance analysis of photovoltaic cell solar power systems using radiation concentration and filtering. Also, a basic plan for the construction of a prototype solar power system with concentration and filtering has been outlined. (Author)

AD-297 101 Div. 7
(TISTM/EJH) OTS price $5.60

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
DESIGN OF HYDROGEN-OXYGEN CAPILLARY TYPE FUEL CELL.
Quarterly technical progress rept. no. 3, 1 Nov 62-31 Jan 63,
by N. P. Bannerton, R. Chesner and others.
15 Feb 63, 23p. illus. tables.
(Contract AF 33(657)8970, Proj. 8173)
Unclassified report

DESCRIPTORS: *Fuel cells, *Power supplies, *Electric power production, Capillaries, Containers, Design, Cooling, Cooling and ventilating equipment, Temperature control, Tests, Spacecraft.

The object of this program is to evaluate the operation of a capillary type hydrogen-oxygen fuel cell while operating in an earth orbit. This report covers the preliminary investigation of the design and fabrication of a fuel cell orbital package. Operational testing of the orbital package and environmental qualification testing was begun. A second orbital package will be designed and fabricated based on information gained from the environmental testing. (Author)

AD-297 247 Div. 7, 26
(TISTE/CAM) OTS price $5.60

Elco Corp., Philadelphia, Pa.
PRODUCTION ENGINEERING MEASURE FOR SUBMINIATURE PACKAGING CONNECTORS.
Final engineering rept., June 61-Dec 62,
by Alexander Wontorsky. Dec 62, 52p. illus.
(Contract DA 36-039-sc-85961)
Unclassified report

DESCRIPTORS: *Electric connectors, *Manufacturing methods, *Packaged circuits, Processing, Quality control, Dies, Electric insulation, Machine tools, Industrial production, Test methods, Subminiature electrical equipment.

As a result of engineering and development work based upon the connectors from previous developments, a line of the subminiature packaging connectors and parts were fabricated. Requirements were fulfilled in design development and engineering. Tooling was modified, new special tooling was fabricated, and new materials were introduced. A pilot production line was established, a time study was determined, and pilot run was performed for the purpose of proving out a manufacturing process and utilizing production methods and techniques. Quality control checks of pertinent points in production were applied and delivery of the pilot run was completed. (Author)

AD-297 389 Div. 7, 8, 14, 25
(TISTE/OHD) OTS price $6.60

Aerospace Information Div., Washington, D. C.
DIRECT ENERGY CONVERSION IN THE USSR. SOLAR CELL RESEARCH.
Comprehensive rept.
6 Feb 63, 59p. incl. illus. 176 refs. (AID rept. no. P-63-20)
Unclassified report

DESCRIPTORS: *Solar cells, *Photoelectric materials, *Research program administration, Semiconductor devices, Semiconductors, Theory, Crystal lattice defects, Impurities, Electrical conductance, Photoconductivity, Surface properties, Silicon, Nuclear particles, Hall effect, Temperature, Phosphorus, Diffusion, Water, Cooling, Effectiveness, Cadmium compounds, Tellurides, Manufacturing methods, Semiconducting films, Sulfides, Solid state physics.

The majority of the photovoltaic cell experts in the USSR seems to be much more interested in working out general formulas to explain experimental results than in trying to solve experimentally any practical problems. While the task of reworking the photovoltaic effect theory may take time, there are reasons to expect that the heavy reliance of Soviet researchers on theoretical considerations is already paying off by allowing them to avoid certain costly mistakes; for example, they correctly chose for their sputniks and p-type-base silicon cell instead of the easier to produce but much less radiation-resistant n-type used in the cells of the US satellites. Another point to consider is the decreasing use of recent foreign data by Soviet photovoltaic cell researchers. While they still seem to receive translations of all the more important recent papers published abroad, they now tend to cite more and more often only those foreign works that were produced before 1960, when the expansion of Soviet solid state physics began manifesting itself. (Author)

AD-297 397 Div. 7, 8
(TISTE/OHD) OTS price $1.10

Naval Research Lab., Washington, D. C.
THREE-PHASE STATIC INVERTER WITH WAVEFORM SYNTHESIS,
by D. J. Hanrahan and W. K. Gardner. 21 Jan 63,
5p. incl. illus. 9 refs. (NRL rept. 5879)
Unclassified report

DESCRIPTORS: *Inverters, *Inverter circuits, Waveform generators, Synthesis, Power equipment, Harmonic analysis, Power transformers, Semiconductor devices, Switching circuits.

The principle of a new, three-phase, static inverter is demonstrated by means of a model circuit. Where sinusoidal output is required, there is a design conflict between efficiency and waveform. The new circuit retains the efficiency of switching, but switched portions of the input are combined so as to approximate a sinusoidal output, thereby minimizing filter requirements. Controlled rectifiers are used because they are available in higher power ratings than transistors. A multiwinding transformer is used to obtain a three-step approximation to a sine wave. Primary turns in the ratio 1.73:3 + 1.73:3 + 2 1.73 theoretically eliminate all harmonics up to the eleventh. The model circuit, constructed with turns in the ratio 1:3:4, exhibits even better waveform because of the filtering effect of the commutating capacitors. A simple criterion for successful commutation is established: the dc bus voltage must be greater than zero when each gate signal is applied. The main advantage of the new circuit is the reduction of filtering necessary for acceptable waveform. Another advantage of the circuit is that it is inherently a three-phase circuit, rather than three single-phase circuits, which promises construction economies and better performance under unbalanced load. (Author)

AD-297 830 Div. 7
(TISTW/JEA) OTS price $4.60

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
A STATISTICAL THEORY OF FEEDBACK CONTROL,
by R. F. Drenick. 28 Dec 62, 39p. (Research rept. no. PIBMRI-1108-62)
(Grant DA-ARO(D)-31-124-G144)
Unclassified report

DESCRIPTORS: *Control systems, *Adaptive control systems, Difference equations, Linear systems, Design, Statistical distributions, Statistical functions, Programming (Computers), Statistical processes, Signals, Feedback, Statistical analysis.

AD-297 879 Div. 7, 8, 5, 6, 25
(TISTW/PCR) OTS price $5.60

Litton Industries, San Carlos, Calif.
INVESTIGATION OF MHD POWER GENERATION. VOLUME III. INTEGRATION WITH CROSSED-FIELD AND LINEAR BEAM MICROWAVE DEVICES.
Rept., 15 July 61-1 Apr 62,
by G. E. Pokorny and A. J. Prommer. 9 July 62, 1v. incl. illus. 2 refs.
(Subcontract to Pratt and Whitney Aircraft, East Hartford, Conn., Contract AF 30(602)2487)
(RADC TDR 62-464, vol. 3) Unclassified report

DESCRIPTORS: *Magnetohydrodynamics, *Microwave equipment, Generators, Feasibility studies, Power amplifiers, Circuits, Klystrons, Compatibility, X band, Radiofrequency power, Amplifiers, Costs, Oscillators, Backward-wave amplifiers, Pictures, Power, Power supplies.

The results of a study program investigating super power microwave generation in connection with a MHD generator is summarized. The results show that a MHD power source is compatible with present day microwave generators, and that a system combining these two devices is technically and economically feasible and constitutes a very attractive package for super power microwave generation. The project was divided into two phases. The first phase was concerned with establishing the basic feasibility of such a system and an evaluation of the relative merits of different super power microwave generation schemes for this specific application. The second phase was a detailed study of specific klystron designs and their compatibility with the features peculiar to a MHD generator. (Author)

AD-298 043 Div. 7, 15
(TISTW/PCR) OTS price $2.60

New York U. Coll. of Engineering, N. Y.
A REPRESENTATION FOR CERTAIN LOSSLESS 2N-PORTS AND A MEASUREMENT METHOD FOR A LOSSLESS 4-PORT.
Scientific rept. no. 7,
by D. J. R. Stock and L. J. Kaplan. 1 Nov 62, 24p. (Technical rept. no. 400-73)
(Contract AF 19(604)7486, Proj. 5635)
(AFCRL 62-974) Unclassified report

DESCRIPTORS: *Transmission lines, Measurement, Circuits, Electric potential, Electrical impedance, Matrix algebra, Transformers, Generators, Standing-wave ratios, Electrical networks.

AD-298 108 Div. 7, 15
(TISTP/JW) OTS price $1.60

Emmanuel Coll. Research Language Center, Boston, Mass.
CALCULATION OF TRANSIENT PROCESSES IN LONG LINES BY MEANS OF BESSEL FUNCTIONS OF TWO INDEPENDENT VARIABLES,
by P. I. Kuznetsov, tr. by Zanis Stuberovskis. Aug 62, 16p. (Trans. from Bulletin ''Electricity'', no. 5, pp. 35-40, 1953)
(Contract AF 19(604)90585)
Unclassified report

DESCRIPTORS: *Transients, Bessel functions, Integrals, Cylindrical bodies, Waveguides, Analysis.

AD-298 119 Div. 7
(TISTM/AM) OTS price $4.60

Tyco, Inc., Waltham, Mass.
RESEARCH RELATING TO FUEL CELLS HYDROGEN DIFFUSION ELECTRODE.
Quarterly progress rept. no. 1,
by A. C. Makrides. Jan 63, 1v.
(Contract DA 49-186-ORD-982)
Unclassified report

DESCRIPTORS: *Fuel cells, *Electrodes, *Hydrogen, *Palladium alloys, Electrochemistry, Transport properties, Kinetic theory, Gold alloys, Silver alloys, Experimental data, Analysis, Crystal lattices, X-ray diffraction analysis, Solubility, Operations, Palladium, Diffusion, Membranes.

8. ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-297 019 Div. 8, 25
(TISTE/OHD) OTS price $2.60

Washington U., Seattle, Coll. of Engineering.
UNIDIRECTIONAL WAVES IN ANISOTROPIC MEDIA AND THE RESOLUTION OF THE THERMODYNAMIC PARADOX,
by Akira Ishimaru. Sep 62, 20p. incl. illus. 16 refs. (Technical rept. no. 69)
(Contract AF19(604)4098, Proj. 5635)
(AFCRL 62-794) Unclassified report

DESCRIPTORS: *Wave transmission, *Propagation, Electromagnetic waves, Mathematical analysis, Partial differential equations, Theory, Thermodynamics.

This paper presents the resolution of so-called thermodynamic paradox, which was first pointed out by Lax and Button. It is shown that the Bresler's resolution is insufficient, and there can exist a single unidirectional mode in a lossless medium. The Poynting theorem is investigated for a discontinuity in the one-way system, and the solution is shown to exhibit a marked discontinuity depending on whether conductivity is zero or approaches zero. It is shown that Maxwell's equations with completely lossless medium which leads to thermodynamic paradox is in fact an ''Improperrly-posed problem,'' which does not correspond to physical reality. (Author)

AD-297 020 Div. 8, 5
(TISTW/JEA) OTS price $1.10

Westinghouse Electric Corp., Newbury Park, Calif.
ADVANCED ASSEMBLY TECHNIQUES FOR CAMERA TUBES.
Interim rept. no. 2, Oct 62-jan 63.

Jan 63, 8p.
(Contract AF 33(657)8675)
Unclassified report

DESCRIPTORS: *Camera tubes, *Cathodes (Electron tubes), *Cathodes, Images, Processing, Sensitivity, Vacuum apparatus, Magnesium compounds, Oxides, Production, Seals (Stoppers), Silver, Photoelectric materials, Photoelectrons, Indium, Quartz, Vacuum seals, Degasification, Photomultipliers, Image intensifiers, Low-pressure research, Manufacturing methods, Photoelectric effects, Stability.

Continued research is presented to show the feasibility of advanced assembly techniques for camera tubes. These techniques center about a concept known as In-Vacuum Processing. The photo image tube components are placed in a vacuum system, various components are processed, the tube is assembled by external manipulation, and sealed before re-exposure to atmospheric pressure. (Author)

AD-297 034 Div. 8, 26
(TISTW/PCR) OTS price $2.25

Texas Instruments, Inc., Dallas.
SEMICONDUCTOR RESISTIVE ELEMENT.
Final rept., 1 Jan 61-31 Dec 62.
31 Dec 62, 1v. incl. illus. tables.
(Contract NObsr-85406, Proj. SR-0080302, ST-9607)
Unclassified report

DESCRIPTORS: *Resistors, *Semiconductors, Low temperature research, Silicon, Tests, Life expectancy, Moisture, Oxidation, Manufacturing methods, Piezoelectric crystals, Epoxy plastics, Materials, Electrical conductance, Ceramic materials, Vapor plating, Reliability, Tables, Photographs, Production.

The general objective of producing a low temperature coefficient of resistance (TCR) device from a semiconductor material was only partially successful. Typical TCR device values above room temperature were never much lower than 150 ppm/C for the silicon resistive element investigated. Low temperature TCR values (at -50 C) were around 500 ppm/C. Load-life stability and resistance to environments (moisture, oxidation) proved as good or better than thin-film resistors on the market. Specific problems encountered (such as ohmic contacts, resistance adjustment, junction effects, etc.) and their solutions are discussed in detail. A manufacturing procedure for producing a polycrystalline silicon device is included: (Author)

AD-297 044 Div. 8, 15
(TISTP/WH) OTS price $7.60

Cruft Lab., Harvard U., Cambridge, Mass.
THEORY OF RADIALLY STRATIFIED MEDIA. PART I. THE BICONICAL ANTENNA IN A RADIALLY STRATIFIED MEDIUM,
by John G. Fikioris. 2 Jan 63, 1v. incl. illus.
(Technical rept. no. 390)
(Contract Nonr-186632, Proj. NR 371-016)
Unclassified report

DESCRIPTORS: *Biconical antennas, *Radio waves, Partial differential equations, Series, Wave transmission, Propagation.

This research is restricted to radially stratified media with $\epsilon = \epsilon(r)$, $\sigma = \sigma(r)$, where r is the radial distance in spherical coordinates. In these coordinates Maxwell's equations are still separable if the complex dielectric factor $\bar{\epsilon} = \epsilon - i\sigma/\omega = \epsilon_0 f(r)$ depends only on r. The angular equation is not affected. However, the radial equation is no longer the spherical Bessel equation of the homogeneous case. Its coefficients depend on the ''stratification function'' f(r) and contain additional singularities in the complex r-plane. The biconical antenna is the most general problem that can be encountered; it requires the solution of the complicated radial equation from r=0 to r=∞. The theory, nevertheless, is readily applicable to all electromagnetic problems arising in the presence of such media. (Author)

AD-297 045 Div. 8, 15
(TISTP/WH) OTS price $8.60

Cruft Lab., Harvard U., Cambridge, Mass.
THEORY OF RADIALLY STRATIFIED MEDIA. PART II. ASYMPTOTIC EXPANSION OF SOLUTIONS OF DIFFERENTIAL EQUATIONS,
by John G. Fikioris. 2 Jan 63, 1v. incl. illus. 20 refs. (Technical rept. no. 395)
(Contract Nonr-186632, Proj. NR 371-016)
Unclassified report

DESCRIPTORS: *Biconical antennas, *Radio waves, Partial differential equations, Series, Wave transmission, Propagation.

AD-297 046 Div. 8, 6
(TISTW/JEA) OTS price $2.60

Airtron, Inc., Morris Plains, N. J.
AN IMPROVED BROADBAND, LOW-LOSS TRANSMISSION LINE SYSTEM TO BE INSTALLED WITHIN A RETRACTABLE SUBMARINE MAST.
Interim development rept., 1 Nov-31 Dec 62,
by Edward S. Hensperger. 21 Feb 63, 24p. incl. illus.
(Contract NObsr-87676, Proj. SS-021001)
Unclassified report

DESCRIPTORS: *Transmission lines, *Submarine antennas, *Antenna masts, *Waveguides, Extremely high frequency, Antenna components, Electronic countermeasures, Design, Waveguide windows, Broadband, Submarines, Coaxial cables.

The second interim phase of the contract to develop an improved transmission line system for use in the ECM mast of a submarine is presented. An 'end fire' version of the ALB-134-to-coaxial transition previously developed is being designed for use at the top of the mast where the connection is made to the antenna. The high band 50 ohm pressure window mock-up was assembled and tested. The maximum VSWR obtained over the high frequency band is 1.40. A larger 70 ohm version of this window was built and tested for use over the low band. Its maximum VSWR from 2.0 to 5.0 Gc/s was 1.20. However, the high band mock-up was also tested over this range, and its maximum VSWR was 1.36. Therefore, the use of two separate window designs to cover the two bands will be avoided by using the small version over both frequency bands. The movable mast design approach was changed from the fixed two-position scheme to a continuously operating system useable over a six foot range of elevation. Considerable mechanical design work is required to accomplish this, and preliminary work is underway. (Author)

AD-297 055 Div. 8
(TISTW/JEA) OTS price $3.60

Doucette, E. I., Associates, Inc., Chatham, N. J.
A QUANTITATIVE STUDY OF THE EVOLUTION OF GASES

FROM ELECTRON TUBES AND MATERIALS.
Scientific rept. no. 3, 18 June-18 Sep 62,
by W. J. Grubbs, G. H. Snider, and F. I. Scott.
31 Oct 62, 34p, incl. illus. tables.
(Contract AF 19(628)326, Proj. 4619)
(AFCRL 62-923) Unclassified report

DESCRIPTORS: *Electron tubes, *Gases, *Spectrum analyzers, Calibration, Vacuum apparatus, Processing, Design, Test methods, Test equipment, Carbon compounds, Hydrogen, Deuterium, Degasification, Measurement, Vacuum pumps, Ions, Sensitivity, Ionization gages, Reliability, Mass spectroscopy.

A higher degree of reliability in electron tubes may be achieved through a better and more comprehensive understanding of the kinds and quantities of gases which occur in these tubes. A bakeable, ultraclean high-vacuum system which incorporates an omegatron mass spectrometer has been constructed for conducting these investigations. Essentially all of the effort during this period has been devoted to the construction and calibration of the various orifice systems utilized in the equipment. The results obtained and detailed indicate that the objectives of the study can in fact be achieved and work is currently progressing in this direction. Some preliminary degassing experiments are described. (Author)

AD-297 066 Div. 8
(TISTE/OHD) OTS price $8.60

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
ANALYSIS AND SYNTHESIS OF SEQUENTIAL SWITCHING CIRCUITS,
by Zvi Kohavi. June 63, 88p. incl. illus. tables, 17 refs. (Research rept. no. PIBMRI-1090-62)
(Grant AFOSR-62-295)
Unclassified report

DESCRIPTORS: *Sequence switches, *Switching circuits, Theory, Electrical networks, Tables, Analysis, Mathematical analysis.

Two of the more difficult problems in the synthesis of sequential switching circuits. The problem of simplifying the flow tables of completely specified switching functions, and the problem of assigning the secondary variables to the different states of the circuit are discussed. A graphical method is developed for the reduction of the number of states in the sequential machine. The method simplifies the techniques of finding the closed sets of compatibles which form the new set of states of the reduced machine. Further development of existing methods for the secondary assignment for both synchronous and asynchronous sequential machines is given. A discussion is also given on the decomposition of sequential machines and its relation to the secondary assignment. (Author)

AD-297 090 Div. 8
(TISTW/PCR) OTS price $8.10

Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
DESIGN, DEVELOPMENT AND FABRICATION OF BAROSWITCH, REMOTE XM-10; BAROSWITCH, PRESENT XM-11; AND CONTROL BAROSWITCH SETTING: XT-4126.
Progress rept. no. 21, 1 Oct-30 Nov 62,
by W. J. Hughes. 7 Dec 62, 82p. incl. illus. tables.
(Contract DA 36-034-ORD-2890, Proj. TN2 - 8109)
Unclassified report

DESCRIPTORS: *Electronic switches, Barometric pressure, Platinum alloys, Tungsten alloys, Manufacturing methods, Tests, Tables, Photographs, Production, Barometers.

A program concerned with the design, development and fabrication of the XM-10 remote baroswitch, the XM-11 present baroswitch and the XT-4126 baroswitch setting control is described. Manufacturing techniques, testing procedures and test results are included.

AD-297 126 Div. 8, 25
(TISTP/WH) OTS price $6.60

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
SCATTERING COEFFICIENTS FOR THE BACKSCATTERING OF ELECTROMAGNETIC WAVES FROM PERFECTLY CONDUCTING SPHERES,
by Marley E. Bechtel. Dec 62, 62p. incl. illus. tables, 4 refs. (Rept. no. AP/RIS-1)
Unclassified report

DESCRIPTORS: *Scattering, *Electromagnetic waves, Spheres, Tables, Scattering.

Tables of scattering coefficients giving the amplitude and phase of the electromagnetic wave scattered by a perfectly conducting sphere are presented. (Author)

AD-297 131 Div. 8, 30
(TISTW/JEA) OTS price $3.60

Aerojet-General Corp., Azusa, Calif.
BUILDING BLOCK STUDY.
Quarterly progress rept. no. 6, 1 July-30 Sep 62,
by N. A. Simpson. 30 Sep 62, 24p. incl. illus. table (Rept. no. 0447-01-6)
(Contract DA 36-039-sc-85159, Proj. 3G89-01-001-01)
Unclassified report

DESCRIPTORS: *Electronic equipment, *Checkout equipment, *Maintenance, Ground support equipment, Maintenance equipment, Automation, Test methods, Communication systems, Control systems, Guided missiles, Tables, Documentation, Military publications, Army equipment, Programming (Computers), Military requirements,

The review of Army technical manuals and related documents to determine the requirements for an integrated effort to automate Army electronic equipment in the field is presented. The program has been divided into the following tasks: TASK A - Missile and munitions commands equipment survey; TASK B - Survey of equipment undergoing research and development; and TASK C - Preparation of reports. The definitions and approach to be followed in carrying out these tasks are outlined. Technical manuals needed in carrying out Task A are itemized. Technical manuals or available documentation for carrying out Task B are to be determined at a later date. Tables of summarized data are presented along with conclusions showing the relative effect of newer equipment on the overall program. (Author)

AD-297 166 Div. 8
(TISTW/JEA) OTS price $3.60

Watkins-Johnson Co., Palo Alto, Calif.
WIDE BAND ELECTRONICALLY TUNABLE FILTERS.
Technical note no. 1, 1 July-30 Sep 62,
by K. L. Kotzebue and A. W. Shaw. Oct 62, 25p. incl. illus. tables (Rept. no. W-J 62-609R5)
(Contract AF 30(602)2625)
(RADC TDR 62-607) Unclassified report

DESCRIPTORS: *Band-pass filters, *Magnetic cores, *Hysteresis, Extremely high frequency, Resonators, Waveguides, Test equipment (Electronics), Interference analyzers, Radiofrequency, Measurement, High pass filters, Radiofrequency filters, Radar equipment, Radiofrequency interference, Broadband, Tuning devices, X band, Magnetic properties.

Work on hysteresis, linearity and temperature compensation in YIG filters is discussed and measurements are reported for hysteresis using both core iron and hypernik pole piece in a WJ-501 filter (2-4 kmc reciprocal bandpass filter). Hysteresis amounts to about 0.1 percent of the tuning range for hypernik pole pieces. Linearity and temperature compensation measurements are reported for core iron pole pieces. Linearity is ± 2 mc and resetability ± 3 mc. With the filter adjusted for minimum temperature coefficient at 3 kmc the temperature coefficient at 4 kmc was maximum of 0.1 mc/oC. A four stage X-band bandpass filter and a 2 stage X-band band-reject filter are described. The X-band bandpass filter suffers from band distortion above 11 kmc as also does the band-reject filter. Even below 11 kmc some improvement of the X-band band-pass filter will be necessary to meet the objectives of the program. The X-band band-reject filter gave the required 50 db rejection at single frequencies but the two resonators gave tracking difficulty. Initial studies of strip line circuits for use below 8 kmc are also outlined. (Author)

AD-297 170 Div. 8
(TISTE/OHD) OTS price $2.60

Westinghouse Electric Corp., Washington, D. C.
HIGH CURRENT AND HIGH VOLTAGE SILICON CONTROLLED RECTIFIERS.
Quarterly rept. no. 2, 1 Oct-31 Dec 62.
31 Dec 62, 20p. incl. illus. tables.
(Contract NObsr-87647, Proj. SR-0080301)
Unclassified report

DESCRIPTORS: *Rectifiers, *Power, Power equipment, Electronic switches, Semiconductor devices, Semiconductors, Electric currents, Electric potential, Encapsulation, Manufacturing methods, Diffusion, Surface properties, Silicon.

Silicon material was received, evaluated and processed through the initial phases of device fabrication. Material evaluation indicates that the silicon approximates the required specifications. Sample fabrication was initiated about one of the device structures. Diffusion results and evaluations are given. A modified capsule design for anticipated improved thermal characteristic is discussed. Design features of both approaches are given. Test fixtures are discussed in view of the extended current rating (500A) compared to conventional devices. (Author)

AD-297 243 Div. 8, 26
(TISTE/OHD) OTS price $2.60

General Electric Co., Owensboro, Ky.
7486 CERAMIC TRIODE, PRODUCTION ENGINEERING MEASURE.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 62, by J. D. Marshall. 31 Dec 62, 20p. incl. illus. tables.
(Contract DA 36-039-sc-86738)
Unclassified report

DESCRIPTORS: *Triodes, *Manufacturing methods, Ceramic materials, Ultrahigh frequency, Vacuum apparatus, Life expectancy, Tests, Cavity resonators, Electron tube heaters, Cathodes (Electron tubes), Production, Electron tubes.

AD-297 260 Div. 8
(TISTE/OHD) OTS price $1.60

Naval Ordnance Lab., White Oak, Md.
A STABLE VOLTAGE-CONTROLLED VARIABLE FREQUENCY OSCILLATOR,
by Charles B. Leslie. Oct 62, 14p. incl. illus.
(Rept. no. NOLTR 62-105)
Unclassified report

DESCRIPTORS: *Oscillators, Feedback, Very low frequency, Tuned circuits, Frequency stabilizers, Impedance matching, Temperature, Test equipment (Electronics), Measurement, Transistors.

A transistorized oscillator was required with a frequency stability of 1 part in 2 x 10 to the 5th power per hour. The frequency was 20.460 kc, variable ± 15 cps by a dc control voltage. The design philosophy and techniques are presented, including a high Q tuned circuit, frequency variation control, feedback stabilization, temperature compensation, and thermal filtering. Test results show that all requirements were met or exceeded. Methods of measuring the frequency to this accuracy are discussed. (Author)

AD-297 273 Div. 8
(TISTP/WH) OTS price $9.60

Hazeltine Research Corp., Little Neck, N. Y.
THEORY OF RADIATION FROM ARRAYS AND APERTURES,
by Donald Richman. 29 Sep 63, 1v. incl. illus. tables (Rept. no. 7666)
Unclassified report

DESCRIPTORS: *Antennas, *Antenna radiation patterns, *Radio waves, *Radio beams, Integral transforms, Synthesis, Theory.

A physical and mathematical theory of radiation directivity is presented which permits the synthesis of antenna arrays to produce radiation patterns which may have arbitrarily selected intensities for all directions of radiation. (Author)

AD-297 286 Div. 8
(TISTE/OHD) OTS price $1.60

Watkins-Johnson Co., Palo Alto, Calif.
DEVELOPMENT OF AN E-BAND AMPLIFIER.
Technical note no. 8, 1 Oct-31 Dec 62,
by E. W. Kinaman. 16 Jan 63, 10p. incl. illus.
(Rept. no. W-J 63-410R32)
(Contract AF 30(602)2422)
(RADC TDR 63-46) Unclassified report

DESCRIPTORS: *Microwave amplifiers, *Traveling wave tubes, *Band-pass filters, Electron tubes, Helixes, Electric discharges, Diodes (Electron tubes), Spheres, Extremely high frequency.

One tube netted five decibel flange to flange gain at 80 gc. The emission of a diode throughout 1450 hours of life test indicates that the

service life of 1000 hours should be no problem. Improvements in the cathode, gun, coupling, waveguide, helix, window and filter areas are detailed. .(Author)

AD-297 337 Div. 8
(TISTW/JEA) OTS price $2.60

Navy Electronics Lab., San Diego, Calif.
CORRELATION BETWEEN THE MINIMUM VIRTUAL E-LAYER HEIGHT h'E AND THE 100-mb CIRCULATION,
by V. R. Noonkester. 22 Jan 63, 28p. incl. illus. 5 refs. (NEL rept. no. 1155)
Unclassified report

DESCRIPTORS: *Electromagnetic wave reflections, *Electromagnetic pulses, *Radio waves, *Ionospheric propagation, Correlation techniques, Barometric pressure, Meteorological parameters, Very low frequency, Low frequency, Ionospheric disturbances, Real variables, Radiofrequency power, Spectrum analyzers, Radiofrequency interference, Analysis, Mathematical analysis, Atmosphere, Ionosphere, Propagation, Electromagnetic waves.

The correlation between the minimum virtual E-layer height h'E at Washington, D. C., and the stratospheric circulation over the eastern United States were studied as a function of frequency and scale size of the circulation. The minimum virtual E-layer height was found to be correlated with a particular type of large-scale circulation at the 100-mb level which has a period of 6.3 days. One of the ten circulation indices used to describe the 100-mb circulation was found to have predominant periods of 22 and 12 days. The predominant 12-day period appears to be controlling the correlation between the 100-mb circulation and h'E at the 6.3-day period. (Author)

AD-297 353 Div. 8
(TISTE/OHD) OTS price $1.60

Airborne Instruments Lab., Inc., Mineola, N. Y.
LOW-NOISE SMALL-SIGNAL AMPLIFIER.
Interim rept. no. 2, 25 Oct 62-25 Jan 63,
by D. Neuf and P. Lombardo. 23 Feb 63, 11p. incl. illus.
(Contract NObsr-87556)
Unclassified report

DESCRIPTORS: *Parametric amplifiers, *Diodes (Semiconductor), *Microwave amplifiers, S band, Broadband, Variable capacitors, Noise (Radio).

High gain (10 db) low-noise amplification (1.6 db) over a 20% bandwidth has been achieved with a single-diode mount. At the present time, two such mounts are being cascaded to determine what overall performance can be achieved over a 40% bandwidth. Amplification over a 40% bandwidth has been obtained from a balanced-diode mount. The noise factor of this amplifier is about 2.5 db at 2500 Mc; however, it is hoped that, through the use of diodes with higher cut-off frequencies, this noise figure can be reduced to less than 2 db. (Author)

AD-297 360 Div. 8, 25
(TISTP/WH) OTS price $4.60

Chalmers U. of Tech. (Sweden).
DYNAMIC NON-LINEAR WAVE PROPAGATION IN IONIZED MEDIA. 7. NON-LINEAR PLASMA WAVES IN A STREAMING HOMOGENEOUS, COLD IONIZED MEDIUM,
by O. E. H. Rydbeck. 1962, 30p. refs. (Research rept. no. 33)
(Contracts AF 61(052)451 and AF 61(052)594)
(RADC TDR 63-86) Unclassified report

DESCRIPTORS: *Plasma physics, *Electromagnetic waves, *Wave transmission, *Plasma oscillations, Ionization, Propagation, Nonlinear systems, Radio waves.

The properties of non-linear travelling and standing plasma waves in homogeneous, ionized cold streams are treated. For the travelling non-linear plasma waves it is possible to obtain direct and simple expressions (provided electronic overtaking does not occur), which relate the charge density to the true stream coordinate. This direct method is not, in general, applicable to the practically important case of standing plasma waves. There exists one exception when the direct method can be applied to standing plasma waves, viz., the very special case of stream plasma resonance. In all other cases, provided there is no electronic overtaking, the indirect, but nevertheless exact, methods of Olving will have to be used. The non-linear maximum charge peaks, or charge bunches, are shown to be rather similar for the physically otherwise quite different travelling and standing non-linear waves. Both rapidly become very rich in harmonics as overtaking is approached. If such a stream runs through a multi-resonant system, high harmonics may be excited in the system. (Author)

AD-297 361 Div. 8
(TISTE/OHD) OTS price $14.00

Magnavox Co., Fort Wayne, Ind.
QUARTZ CRYSTAL OSCILLATOR CIRCUITS.
Final rept., 1 July 61-30 June 62,
by D. Firth and J. R. Yope. 30 June 62, 1v. incl. illus. tables, refs. (Serial no. TP62-690)
(Contract DA 36-039-sc-88892, Proj. 3G-26-05-001)
Unclassified report

DESCRIPTORS: *Oscillators, *Crystal oscillators, *Quartz resonators, Extremely low frequency, Very low frequency, Low frequency, Medium frequency, Very high frequency, Electron tubes, Transistors, Impedance matching, Mathematical analysis, Circuits, Design.

A presentation is made of extensive data supporting the design and operation of quartz crystal oscillators. Design procedures are developed for both high and low frequency oscillator circuits in the 1-kc to 200-mc range. Vacuum tubes and transistors were studied in both the low and the high frequency ranges (1 kc to 800 kc and 30 mc to 200 mc). A general discussion is given of the properties of quartz crystals, the characteristics of tubes and transistors, and impedance transforming networks. The general analysis of an oscillator is presented, a general design specification is developed, and a basic design procedure is established. Separate sections are devoted to design procedures for high-frequency and low-frequency crystal oscillators. A design data section is included, containing the results of oscillator evaluations. (Author)

AD-297 370 Div. 8, 5, 31
(TISTE/CAM) OTS price $11.00

New Mexico U. Engineering Experiment Station, Albuquerque.
SUBMARINE COMMUNICATIONS RESEARCH.
Interim progress rept. for Oct 61. Jan 63, 146p. incl. illus. tables (Rept. no. PR-42)
(Contract Nonr-279801)
Unclassified report

Presented to the U. S. Navy, 18-19 Feb 63, at the Naval Research Lab., Washington, D. C.

DESCRIPTORS: *Submarines, *Communications systems, *Electromagnetic waves, Extremely low frequency, Very low frequency, Sea water, Surfaces, Ionosphere, Underwater to air, Underwater to surface, Submarine antennas, Satellite antennas, Antenna radiation patterns, Theory, Feasibility studies, Bibliographies, Propagation.

Progress was continued on submarine communications research. From the general approach to the problem of investigating submarine communications, the work on the ELF/VLF portion of the frequency spectrum was divided into three general areas; these are: (1) study of ELF/VLF propagation in air, sea and the ionosphere; (2) investigation of ELF/VLF antennas in these media; (3) modeling and experimentation to confirm results of the theoretical investigations. Each of these areas is subdivided into a number of tasks with specific goals. A general summary is presented on each task. (Author)

AD-297 373 Div. 8
(TISTE/OHD) OTS price $8.60

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
EQUIRIPPLE TRANSMISSION LINE NETWORKS,
by Werner Kohler and Herbert J. Carlin.
24 Jan 63, 1v. incl. illus. tables, 11 refs.
(Research rept. no. PIBMRI-1089-62)
(Contract AF 30(602)2213)
(RADC TDR 62-629) Unclassified report

DESCRIPTORS: *Transmission lines, *Microwave networks, Mathematical analysis, Complex numbers, Band-pass filters, Microwave amplifiers, Theory, Impedance matching.

This discussion considers the case in which the cascade configuration of lossless, equilength transmission lines between a generator and load is augmented by the presence of lossless transmission line stubs, having lengths commensurate with those of the lines. Tchebycheff-type response specification is developed for specific types of this generic class, which, because of the stubs, possess finite w-frequency zeros of transmission. One specific type of particular interest is the single-shunt, short-circuited stub bandpass filter. This network is explicitly considered. A means for the apriori determination of load resistance and stub characteristic impedance, with the stub at a given end of the cascade, is developed. A technique is then evolved whereby one may, by altering the stub position, systematically adjust the value of the terminating resistance. The design of a reflection-type tunnel diode amplifier is given, utilizing a transmission line equalizer. The diode parasitics are approximated in the frequency band of interest by transmission line stubs. This approximation circumvents the problem of transcendental functions inherent in lumped reactance-transmission line mixtures and enables the adaptation of the above-mentioned equiripple response functions by an extension of the Fano theory of broadbanding. (Author)

AD-297 374 Div. 8
(TISTP/TL) OTS price $3.60

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
DISTRIBUTED EQUIVALENTS OF BRUNE SECTIONS,
by Akio Matsumoto. 28 Sep 62, 28p. illus.
4 refs. (Rept. no. PIBMRI-1038-62)
(Contract AF 30(602)2213, Proj. 8505)
(RADC TDR 62-582) Unclassified report

DESCRIPTORS: *Electrical networks, Matrix algebra, Electric current, Propagation, Transmission lines, Electromagnetic fields, Wave transmission, Synthesis.

Six new descriptive Brune sections are presented in many instances they are preferable to those suggested by Ikeno and Saito. Included is a complete design technique. (Author)

AD-297 382 Div. 8, 25
(TISTE/OHD) OTS price $3.60

Elcon Lab., Inc., Watertown, Mass.
STUDY OF TECHNIQUES FOR A HIGH POWER, FAST WAVE PLASMA CYCLOTRON AMPLIFIER.
Quarterly interim engineering rept. no. 3,
by Edwin Langberg, Maiken Naylor, and David Park.
20 Feb 63, 28p. incl. illus. refs. (Rept. no. R-2-63-4)
(Contract AF 33(657)8852)
Unclassified report

DESCRIPTORS: *Microwave amplifiers, Plasma oscillations, Argon, Carbon dioxide, Xenon, Cavity resonators, Mathematical analysis, Vacuum apparatus, Plasma physics.

By definition, fast-wave amplification is based on a negative conductivity component of the plasma which causes the growth of an electromagnetic wave passing through it. The dielectric constant of the plasma need not differ significantly from that of free space, since the plasma is not used to slow down the propagating wave. In general, the plasma frequency is well below the signal frequency to be amplified for all applications described here. The basic advantage of the fast mode of plasma amplification as compared with a slow-wave plasma amplification is the ease of coupling to and from the plasma and the potential broad-band properties which are associated with this mode of amplification. Further, one is not restricted at high microwave frequencies by electron densities which can be realized practically and which provide the upper frequency limit for use of plasma as a slow-wave medium. (Author)

AD-297 400 , Div. 8
(TISTE/OHD) OTS price $3.60

Naval Ordnance Lab., White Oak, Md.
DIFAIR, AN ADJUSTABLE DIGITAL FILTER,
by C. N. Pryor. 27 Sep 62, 9p. illus. tables,
2 refs. (Rept. no. NOLTR 62-171)
Unclassified report

DESCRIPTORS: *Filters (Electromagnetic wave), *Digital systems, Mathematical analysis, Analog-to-digital converters, Digital-to-analog converters, Noise (Radio), Delay lines, Signal-to-noise ratio.

Many signal processing operations, such as matched filtering, call for filters having specific characteristics. These characteristics may be specified in terms of the impulse response of the filter. The present device simulates such filters by means of high-speed digital computation of the convolution integral once the desired impulse response is set into the selector switches. The circuitry, over-all characteristics, and several applications of the equipment are described. (Author)

AD-297 406 Div. 8
(TISTE/OHD) OTS price $3.60

Technische Hochschule, Munich (Germany).
RESEARCH ON ELECTRICALLY SMALL ANTENNAS,
by H. H. Meinke. 30 Nov 62, 18p. incl. illus.

(Technical rept. no. 2)
(Contract AF 61(052)506)
Unclassified report

DESCRIPTORS: *Antennas, Dielectrics, Impedance matching, Electrical impedance, Antenna feeds, Antenna configurations, Analysis, Ferrites.

A performance improvement of the electrically small antenna can only be obtained by achieving a bandwidth enlargement of the antenna impedance. A bandwidth enlargement of electrically small antennas by surrounding them with ferrite of the same maximum height as the antenna is only possible if the geometrical height of the antenna becomes larger than 1/20 lambda zero. The outer regions of the ferrite form cause this bandwidth broadening effect. Therefore a shape is used where the ferrite begins at some distance away from the feeding point of the antenna. (Author)

AD-297 415 Div. 8
(TISTE/OHD) OTS price $4.60

Philco Corp., Palo Alto, Calif.
FGS ANTENNA RESONANCE STUDY,
by Hugh L. Smith and Henry B. Lee. 27 Feb 63, 43p. incl. illus. (Rept. no. WDL-TR2035)
(Contract AF 04(695)113)
Unclassified report

DESCRIPTORS: *Antennas, *Mechanics, *Control systems, Mathematical analysis, Servomechanisms, Functions, Structures, Gears, Bearings, Accelerometers, Test methods, Drives.

This report contains the results which were obtained from two series of tests and an analytical investigation conducted to determine the mechanical dynamic characteristics of the three-axis T&D antenna system. The method of analysis is given with differential equations of motion which describe the system. The analysis of individual components which make up the mathematical model is discussed. The results of the theoretical analysis are given in the form of structural transfer functions which yield outputs of coordinates on the antenna. Transfer functions are interpreted to yield the natural frequencies and the locked-rotor frequencies of the antenna. The field test results are presented, together with a discussion of the correlation between these test values and the analytical results. A discussion is presented of the areas which govern antenna behavior, together with some suggested modifications which will upgrade antenna performance. (Author)

AD-297 419 Div. 8, 2
(TISTP/GRW) OTS price $3.60

Ionosphere Research Lab., Pennsylvania State U., University Park.
PERTURBATION METHODS APPLIED TO THE REFLECTION OF RADIO WAVES FROM THE IONOSPHERE,
by P. W. Norman. 1 Feb 63, 28p. incl. illus. 10 refs. (Scientific rept. no. 178)
(Contract AF 19(604)4563, Proj. 8605)
(AFCRL-63-215) Unclassified report

DESCRIPTORS: *Radio waves, *Ionospheric propagation, Perturbation theory, Partial differential equations, Terrestrial magnetism, Reflection, Mathematical analysis.

A perturbation approach to the problem of determining the electromagnetic field reflected from the ionosphere is presented. It is shown that by treating the earth's field of magnetic induction as a perturbation, Maxwell's equations and the constitutive relationship are considerably simplified. First order approximations for the field reflected from a homogeneous sharply bounded ionosphere are found. The perturbation method to be developed has certain limitations which are discussed. (Author)

AD-297 420 Div. 8, 26, 30
(TISTW/PCR) OTS price $4.60

David Sarnoff Research Center, Princeton, N. J.
APPLICATIONS OF THIN FILM TRANSISTORS TO DIGITAL CORRELATION TECHNIQUES.
Final rept.,
by E. W. Doolittle, A. Harel and others.
31 Dec 62, 23p. illus. 12 refs.
(Contract NObsr-87565)
Unclassified report

DESCRIPTORS: *Transistors, *Semiconducting films, *Correlation techniques, Manufacturing methods, Production, Tests, Jigs, Gates (Circuits), Reliability, Metals, Oxides, Computer logic, Data storage systems, Silicon compounds, Dioxides, Aluminum, Anodes (Electrolytic cell), Photographs, Thin films (Storage devices), Circuits, Digital systems.

The objective was to demonstrate the suitability of thin film transistors (TFT's) to digital circuit applications, and to fabricate integrated arrays of TFT's during a later phase. A register of TFT flip-flops and comparator circuitry was chosen as a suitable test vehicle. Initial work was to be with individual TFT's while ultimately the entire register and comparator circuitry would be integrated. Unexpected difficulties in producing large quantities of good TFT's delayed the evaluation of the operation of the register. The primary difficulty was the drift in the transconductance of the units. However, a register was built and tested. The flip-flops used were capable of switching at 4 mc when overdriven from a low impedance source. A 1 mc rate was achieved when driven from a high impedance source. The internal speed of the TFT was determined to be in the nanosecond range, the operating speed being limited primarily by the input electrode and feedback capacitance. (Author)

AD-297 434 Div. 8, 25
(TISTP/WH) OTS price $2.60

Royal Inst. of Tech. (Sweden).
INTERACTION BETWEEN MICROWAVES AND PLASMAS IN GAS DISCHARGES AND SEMICONDUCTORS.
Summary rept.,
by B. Agdur. 15 Dec 62, 21p. incl. illus.
(Contract AF 61(052)552)
(RADC TDR 63-49) Unclassified report

DESCRIPTORS: *Plasma physics, *Microwave amplifiers, *Waveguides, *Microwaves, *Gas discharges, *Semiconductors, Waveguide couplers, Resonance, Propagation.

AD-297 436 Div. 8, 19, 18
(TISTE/OHD) OTS price $6.60

Tellurometer (Pty) Ltd., Union of South Africa.
SHORT RANGE ELECTRONIC POSITIONING EQUIPMENT.
Final technical rept., 23 Feb 59-30 Sep 61 on Microwave System of Distance Measurement,
by L. F. Haughton and J. F. Ogle. 1 Feb 62, 54p. incl. illus. tables, 7 refs.
(Contract DA 44-009-eng-3811, Proj. 8-35-10-500)
Unclassified report

DESCRIPTORS: *Position finding, *Radio navigation, Hyperbolic navigation, Medium frequency, Crystal oscillators, Frequency modulation, Test method, Experimental data, Radio equipment, Portable.

The equipment, which was actually developed before the contract was issued, is described and its limitations are listed. The modifications that were made are dealt with in detail. As a result of pre-acceptance tests, further modifications were carried out. These were followed by acceptance trials in the United States. These test results are given in detail, together with the relevant graphs, and are discussed later in the report. The report concludes with recommendations regarding further development aimed at simplifying the equipment in certain respects and extending its capabilities. (Author)

AD-297 440 Div. 8
(TISTE/CAM) OTS price $10.50

Temco Electronics Div., Temco Electronics and Missiles Co., Dallas, Tex.
4 KW VHF LINEAR AMPLIFIER (TYPE FA-5438).
Final rept.
18 Oct 62, 130p. incl. illus. tables.
(Contract FAA/BRD-400, Proj. 113-8-2D)
Unclassified report

DESCRIPTORS: *Radiofrequency amplifiers, Linear systems, Very high frequency, Beam power tubes, Modulation, Models (Simulation), Model tests, Reliability, Maintenance, Tables, Electric potential, Tuned amplifiers, Solid state physics.

A 4 KW carrier power (16 KW P.E.P.) VHF linear amplifier covering the frequency range of 118 to 136 mc was developed for long-distance communication. With the exception of the two ceramic beam power tetrodes, the entire amplifier was of solid state construction. Two ML 7007 tubes operating Class AB1 in a grounded cathode circuit were used in the amplifier. An rf harmonic filter made of varying Zc line sections was used to reduce the second and third harmonic content of the amplifier to the specification levels. Sufficient metering circuitry was included to allow easy set up and tuning of the amplifier. Power distribution and control circuitry was included to automatically sequence and interlock the applied voltages during starting and stopping of the amplifier. All components in the amplifier were significantly derated for reliability considerations. Two amplifiers were completed and satisfactorily tested. (Author)

AD-297 469 Div. 8
(TISTW/FEM) OTS price $4.60

Teledyne Systems Corp. Hawthorne, Calif.
UNFURLABLE ANTENNA TECHNIQUES FOR HIGH-GAIN APPLICATIONS.
Interim engineering rept. no. 1, 1 June-17 Dec 62,
by J. C. Polk. 1 Feb 63, 35p. (TSC technical rept. no. 63-ESD-19)
(Contract AF 33(657)8709)
Unclassified report

DESCRIPTORS: *Antennas, *Satellite antennas, Conical antennas, Helical antennas, Antenna feeds, Orifices, Broadband, X band, K band, Beams (Electromagnetic), Radio beams, Parabolic antennas, Design.

AD-297 470 Div. 8
(TISTE/PAR) OTS price $1.60

Westinghouse Electric Corp., Pittsburgh, Pa.
ALL-TRANSISTOR HYDROPHONE PREAMPLIFIER,
by C. B. Durgin. 29 Nov 62, 11p. (Scientific paper no. 62-869-437-P1)
Unclassified report

DESCRIPTORS: *Hydrophones, *Preamplifiers, *Transistor amplifiers, Low frequency, Noise (Radio), Silicon, Semiconductor devices, Diodes (Semiconductor), Feedback amplifiers, Power supplies, Semiconductors, Germanium, Very low frequency, Extremely low frequency, Transistors.

AD-297 472 Div. 8, 14
(TISTE/JBM) OTS price $6.60

Western Electric Co., Winston-Salem, N. C.
INDUSTRIAL PREPAREDNESS STUDY: LACQUER FILM CAPACITORS.
Quarterly progress rept. no. 15, 25 Aug-25 Nov 62,
by J. B. Rawls. 25 Nov 62, 58p.
(Contract DA 36-039-sc-81268)
Unclassified report

DESCRIPTORS: *Capacitors, Polymers, Carbonates, Manufacturing methods, Heat transfer, Cellulose acetates, Resistance (Electrical), Seals (Stoppers), Dielectric films, Varnishes, Films, Thickness, Production.

AD-297 488 Div. 8, 25
(TISTP/JW) OTS price $3.60

Laboratory for Insulation Research, Mass. Inst. of Tech., Cambridge.
DESIGN OF A QUADRUPOLE MASS SPECTROMETER,
by C. E. Woodward and C. K. Crawford. Jan 63, 30p. (Technical rept. no. 176)
(Contracts AF 33(616)8353 and Nonr-184110, Proj. NR 018-801)
Unclassified report

DESCRIPTORS: *Spectroscopy, Filters (Electromagnetic wave), Feedback amplifiers, Oscillographs, Instrumentation.

AD-297 509 Div. 8, 5
(TISTW/PCR) OTS price $10.10

RCA Defense Electronics Products, Camden, N. J.
MICRO-MODULE PRODUCTION PROGRAM.
Quarterly rept. no. 18, 1 July-1 Oct 62.
1 Oct 62, 1v.
(Contract DA 36-039-sc-75968)
Unclassified report

DESCRIPTORS: *Microminiaturization (Electronics), Capacitors, Resistors, Cermets, Transistors, Semiconductors, Crystals, Materials, Coatings, Soldering, Cleaning, Reliability, Radio receivers, Radio transmitters, Production, Computer logic, Printed circuits, Design, Specifications, Diodes, Tests, Pictures, Computers.

AD-297 533 Div. 8
(TISTE/JBM) OTS price $2.60

Microwave Associates, Inc., Burlington, Mass.
SOLID-STATE S AND X BAND LIMITERS.
Quarterly progress rept. no. 3, 1 Oct-31 Dec 62,
by Robert Tenenholtz. 6 Feb 63, 12p. illus.
(Contract NObsr-87307)
Unclassified report

DESCRIPTORS: *Diodes (Semiconductor), *Limiters, *Semiconductor devices, Transmission lines, S band, X band, Power, Electrical impedance, Electronic switches, Theory, Microwave frequency.

AD-297 561 Div. 8, 25
(TISTP/WH) OTS price $3.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
PROPAGATION OF RADIO WAVES (Rasprostraneniye Radiovoln),
by M. P. Dolukhanov. 15 Feb 63, 490p. incl. illus. tables, 75 refs. (Trans. no. FTD-TT-62-582 from Gosudarstvennoye Izdatel'stvo Literatury po Voprosam Svyazi i Radio, Moskva, pp. 1-391, 1960)
Unclassified report

DESCRIPTORS: *Radio waves, *Propagation, Electromagnetic waves, Textbooks.

AD-297 741 Div. 8
(TISTW/PCR) OTS price $5.60

Georgia Inst. of Tech. Engineering Experiment Station, Atlanta.
AGING CHARACTERISTICS OF QUARTZ CRYSTAL RESONATORS.
Quarterly rept. no. 7, 15 Aug-15 Nov 62,
by R. B. Belser and W. H. Hicklin. 15 Nov 62, 48p. incl. tables.
(Contract DA 36-039-sc-87407, Proj. 3A-99-15-004)
Unclassified report

DESCRIPTORS: *Quartz resonators, Frequency, Furnaces, Neutrons, Production, Aluminum, Gold, Gamma rays, Measurement, X-ray diffraction analysis, Stresses, Mathematical analysis, Photographs, Tests, Aging (Materials).

AD-297 761 Div. 8
(TISTW/PCR) OTS price $6.60

RCA Defense Electronic Products, Camden, N. J.
DEVELOPMENT OF MICROELEMENT DIODES.
Formal engineering rept., 21 June-20 Nov 62 on Micro-Module Program Extension 1.
28 Dec 62, 1v.
(Contract DA 36-039-sc-75968)
Unclassified report

DESCRIPTORS: *Diodes, Microminiaturization (Electronics), Radio receivers, Design, Tests, Production, Specifications, Test methods, Manufacturing methods, Computers.

AD-297 763 Div. 8, 26
(TISTE/JBM) OTS price $2.60

Radio Corp. of America, Somerville, N. J.
RESEARCH AND DEVELOPMENT ON HIGH CURRENT TUNNEL DIODES.
Interim development rept., 1 Oct-31 Dec 62.
31 Dec 62. 24p.
(Contract NObsr-87540, Proj. SR-0080301)
Unclassified report

DESCRIPTORS: *Diodes (Semiconductor), Manufacturing methods, Gallium compounds, Arsenides, Resistance (Electrical), Temperature, Germanium, Effectiveness, Electric currents, Packaged circuits, Electric potential, Impurities, Diffusion, Soldering, Etched crystals, Production.

AD-297 774 Div. 8
(TISTW/PCR) OTS price $4.60

Shockley Transistor Corp., Mountain View, Calif.
A FEASIBILITY STUDY OF A NEW FOUR LAYER DIODE AS A PULSE MODULATOR SWITCH.
Final rept.,
by Kurt Hubner and R. M. Scarlett. 3 Oct 62, 41p.
(Contract AF 30(602)2811, Proj. 5573)
(RADC TDR 62-497) Unclassified report

DESCRIPTORS: *Pulse modulation, *Diodes, Feasibility studies, Silicon, Design, Diffusion, Containers, Failure (Mechanics), Circuits, Electric potential, Electric currents, Tests, Life expectancy, Pictures, Electronic switches.

AD-297 791 Div. 8
(TISTE/AW) OTS price $11.00

Sperry Gyroscope Co., Great Neck, N. Y.
(No title).
Quarterly progress rept. no. 2, 1 Oct-30 Dec 57 on Project LIGHTNING.
30 Dec 57, 138p. (Rept. no. PX 617-2)
(Contract NObsr-72728)
Unclassified report

DESCRIPTORS: *Microwave equipment, *Traveling-wave tubes, *Materials, *Cryogenic storage devices, *Diodes (Semiconductor), *Transistors, *Magnetic materials, Delay circuits, Ferrites, Ferroelectric materials, Thin films (Storage devices), Tin, Lead, Permeability (Magnetic), Refractory materials, Parametric amplifiers, Digital computers, Data processing systems, Computer logic, Electronic switches, Superconductivity, Computer storage devices.

AD-297 792 Div. 8
(TISTE/AW) OTS price $14.00

Sperry Gyroscope Co., Great Neck, N. Y.
(No title).
Quarterly progress rept. no. 3, 31 Dec 57-30 Mar 58 on Project LIGHTNING.
30 Mar 58, 195p. (Rept. no. PX 617-3)
(Contract NObsr-72728) Unclassified report

DESCRIPTORS: *Microwave equipment, *Traveling-wave tubes, *Materials, *Cryogenic storage devices, *Diodes (Semiconductor), *Transistors, *Magnetic materials, X band, Delay circuits, Ferrites, Ferroelectric materials, Thin films (Storage devices), Tin, Lead, Permeability (Magnetic), Refractory materials, Parametric amplifiers, Digital computers, Data processing systems, Computer logic, Electronic switches, Superconductivity, Computer storage devices.

AD-297 813 Div. 8, 6
(TISTW/PCR) OTS price $9.10

Litton Systems, Inc., College Park, Md.
INFRA-LOW SIDELOBE ANTENNA AS-883/GPX.
Final development rept., 15 May 58-3 Aug 62.
15 Nov 62, 96p.
(Contract AF 30(602)1740, Proj. 1981)
(RADC TDR 62-409) Unclassified report

DESCRIPTORS: *Radar antennas, Design, Tests, Transmission lines, Phase measurement, Specifications, Test equipment (Electronics), Test methods, Standing-wave ratios, Errors, Side-looking radar.

AD-297 834 Div. 8
(TISTE/AW) OTS price $4.60

Army Electronics Research and Development Lab., Fort Monmouth, N. J.
PUBLICATIONS, PRESENTATIONS AND PATENTS.
Report for Jan-Dec 62.
1 Jan 63, 35p. (Rept. no. SELRA-1873)
Unclassified report)

DESCRIPTORS: *Electronics, *Solid state physics, Patents, Military publications.

Division 8 - ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-297 868 Div. 8
(TISTW/JEA) OTS price $10.50

Goodyear Aircraft Corp., Akron, Ohio.
ADVANCED ANTENNA DESIGN TECHNIQUES.
Quarterly progress rept. no. 2, 1 Sep-15 Dec 62, by D. D. Collins and J. C. Bell, Jr. 29 Jan 63, 133p. (Rept. no. GER 10979; Rept. no. 2)
(Contract DA 36-039-sc-90746, Proj. 3A99-12-001)
Unclassified report

DESCRIPTORS: *Antennas, *Radar antennas, *Antenna simulators, Antenna components, Antenna configurations, Antenna feeds, Operation, Parabolic antennas, Satellite antennas, Radomes, Guided missile tracking systems, Satellites (Artificial), Design.

AD-297 870 Div. 8
(TISTP/MB) OTS price $9.10

Carlyle Barton Lab., Johns Hopkins U., Baltimore, Md.
SIGNAL ANALYSIS II: ESTIMATION OF THE AMPLITUDES OF NARROW-BAND DETERMINISTIC SIGNALS OBSERVED INCOHERENTLY IN NORMAL NOISE BACKGROUNDS,
by David Middleton. Feb 63, 103p. (Technical rept. no. AF-100)
(Contract AF 33(616)6753)
Unclassified report

DESCRIPTORS: *Radar signals, *Radio signals, Analysis, Detection, Communications theory, Statistical distributions, Statistical functions, Radar, Theory, Signal-to-noise ratio, Wave analyzers, Signals, Noise (Radar), Noise (Radio), Noise analyzers, Probability, Statistical analysis.

AD-297 872 Div. 8
(TISTE/RAM) OTS price $2.60

Kansas State U., Manhattan.
HIGH FREQUENCY MODULATION OF LIGHT.
Final rept.,
by Basil Curnutte, Jr. July 62, 23p.
(Contract DA 49-186-502-ORD-433)
Unclassified report

DESCRIPTORS: *Discharge tubes, *Light, High frequency, Pressure, Temperature, Digital computers, Simulation, Mathematical analysis, Gas discharges, Intensity, Hydrogen, Modulation.

AD-297 903 Div. 8, 6
(TISTW/JEA) OTS price $2.60

Microwave Associates, Inc., Burlington, Mass.
PEM - SOLID STATE MICROWAVE TR-ATR SWITCH.
Quarterly technical rept. no. 2, 18 July-18 Oct 62,
by Robert Tenenholtz. 18 Oct 62, 17p. illus.
(Contract DA 36-039-sc-86718)
Unclassified report

DESCRIPTORS: *Radar duplexers, *Diodes (Semiconductor), *Electronic switches, Test equipment (Electronics), Radiofrequency power, Life expectancy, Design, Reliability, Operation, Power supplies, X band, Limiters, Semiconductors, Microwave equipment, Semiconductor devices.

AD-297 906 Div. 8
(TISTW/JEA) OTS price $6.60

Texas Instruments Inc., Dallas.
PRODUCTION ENGINEERING MEASURES TO INCREASE TRANSISTOR RELIABILITY.
Quarterly progress rept. no. 2, 1 Aug-31 Oct 62, by James R. Reese, Stratt Georgoulis and others. 31 Oct 62, 63p.
(Contract DA 36-039-sc-86730)
Unclassified report

DESCRIPTORS: *Transistors, Silicon, Germanium, Test sets, Test methods, Processing, Coatings, Welding, Stresses, Failure (Mechanics), Diffusion, Temperature, Reliability, Quality control.

AD-297 920 Div. 8, 25
(TISTE/JBM) OTS price $7.60

National Co., Inc., Malden, Mass.
INVESTIGATION OF A NUCLEAR MAGNETIC RESONANCE OSCILLATOR.
Final rept.,
by Alexander Ganssen and Earl Law Sloan, III.
Sep 62, 67p.
(Contract AF 30(602)2469, Proj. 4519)
(RADC TDR 63-25) Unclassified report

DESCRIPTORS: *Microwave oscillator, *Masers, *Microwave amplifiers, Temperature, Stabilization, Magnets, Niobium, Superconductivity, Electromagnets, Theory, Tests, Nuclear resonance, Nuclear spins, Differential equations, Tuned circuits, Magnetic fields, Particle accelerators, Protons.

AD-297 949 Div. 8, 25
(TISTE/CAM) OTS price $4.60

Litton Industries, San Carlos, Calif.
HIGH PERVEANCE GUN STUDY.
Quarterly rept. no. 6, 1 Sep-1 Dec 62, by R. D. Harris and J. R. Hechtel. 29 Dec 62, 37p.
(Contract DA 36-039-sc-87313)
Unclassified report

DESCRIPTORS: *Electron guns, *Electrostatics, *Magnetrons, Focusing, Electron accelerators, Space charges, Electric fields, Magnetic fields, Digital computers, Analog computers, Cathodes (Electron tubes), Processing, Particle trajectories, Particle beams, Particle accelerator targets, Electron beams.

AD-297 979 Div. 8, 5
(TISTE/PAR) OTS price $4.60

Sylvania Electric Products Inc., Buffalo, N. Y.
DEVELOPMENT OF C- AND X-BAND POWER GENERATORS.
Quarterly rept. no. 2, 1 Sep-30 Nov 62, by J. Kellett. 31 Dec 62, 36p. (Rept. no. A35-5-5.0-15)
(Contract DA 36-039-sc-90757, Proj. 3A99-21-002)
Unclassified report

DESCRIPTORS: *Radiofrequency generators, *Radiofrequency pulses, *Radiofrequency power, Very high frequency, Transistors, Frequency multipliers, Frequency stabilizers, Microwave oscillators, Frequency converters, Pulse generators, Pulse amplifiers, Power amplifiers, Radiofrequency amplifiers, Transistor amplifiers, Semiconductor devices, Diodes (Semiconductor), Tuned circuits, Oscillators, Circuits, Microwave networks, Microwaves, Radiofrequency oscillators, C band, X band.

AD-298 042 Div. 8
(TISTE/RAM) OTS price $2.60

Applied Research Inc., Port Washington, N. Y.
(No title).
Quarterly rept. for 1 Aug-31 Oct 62.
29 Jan 63, 18p. (Rept. no. 491-01)
(Contract NObsr-81262)
Unclassified report

DESCRIPTORS: *Spectrum analyzers, *Interference analyzers, Display systems, Circuits, Sweep generators, Radiofrequency oscillators, Band-pass filters, Filters (Electromagnetic wave), Attenuators, Power supplies, Antenna radiation patterns, Intermediate frequency amplifiers, Radiofrequency amplifiers, Ultrahigh frequency, Very high frequency, Preamplifiers, Noise analyzers, Radiofrequency spectroscopy, Radiofrequency.

AD-298 065 Div. 8
(TISTE/JBM) OTS price $3.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
STORAGE-TIME DELAY CALCULATION FOR A TRANSISTOR PULSE AMPLIFIER,
by John H. Reaves. 13 Feb 63, 22p. illus. (Rept. no. 51G-5)
(Contract AF 19(628)500)
(AFESD TDR 63-23) Unclassified report

DESCRIPTORS: *Transistor amplifiers, *Pulse amplifiers, Determination, Mathematical analysis, Circuits, Time, Timing devices, Electric currents, Signals, Measurement, Transistors.

AD-298 088 Div. 8
(TISTP/MH) OTS price $2.60

Harry Diamond Labs., Washington, D. C.
THE POWER SPECTRUM PRODUCED BY THE LINEAR MIXING OF SIGNALS FREQUENCY-MODULATED BY GAUSSIAN NOISE,
by Louis M. Tozzi. 15 Nov 62, 26p. (Rept. no. TR-1093)
(DOFL Proj. 26100)
Unclassified report

DESCRIPTORS: *Communications theory, *Noise, *Mixers, *Signals, Statistical distributions, Statistical functions, Integral transforms, Taylor's series, Integration, Linear systems, Frequency modulation.

AD-298 127 Div. 8
(TISTE/JBM) OTS price $3.60

Electronic Defense Lab., Mountain View, Calif.
MULTIPLE-OCTAVE LOW-NOISE MICROWAVE PREAMPLIFIER,
by Richard D. Kelch. 24 Oct 62, 34p. (Technical memo. no. EDL-M481)
(Contract DA 36-039-sc-87499)
Unclassified report

DESCRIPTORS: *Microwave amplifiers, *Preamplifiers, *Traveling wave tubes, Broadband, Noise (Radio), Coaxial cables, Stabilization, Phase measurement, Delay lines, Low-pass filters, Electric filters, Dielectrics, Electric cables, Radio receivers, Microwave frequency, Microwave equipment, Phase shifters, Signals, Multiplex.

9. FLUID MECHANICS

AD-297 023 Div. 9
(TISTA/FRL) OTS price $10.50

United Aircraft Corp., East Hartford, Conn.
FLUID AMPLIFICATION.
Interim rept. no. 6 on Aerodynamic Studies of Pure-Pneumatic Systems,
by Robert E. Olson. 12 Oct 62, 133p. incl. illus. (Rept. no. A1771-16)
(Contract DA 49-186-ORD-912)
Unclassified report

DESCRIPTORS: *Jets, Compressible flow, Theory, Tests, Model tests, Wind tunnel models, Analysis, Integral equations, Weight, Fluid flow, Pneumatic systems, Pressure, Aerodynamic characteristics.

A study is reported of the aerodynamic characteristics of two-dimensional compressible jets both unbounded and bounded. An objective of the work is to establish quantitative procedures for predicting (1) flow profiles at various stations and (2) the pressure recovery of receiving apertures. (Author)

AD-297 031 Div. 9, 1, 12
(TISTA/VGW) OTS price $26.00

Thompson Ramo Wooldridge, Inc., Canoga Park, Calif.
ADVANCED CONCEPTS OF STOCHASTIC PROCESSES AND STATISTICS FOR FLIGHT VEHICLE VIBRATION ESTIMATION AND MEASUREMENT.
Final rept.,
by Julius S. Bendat, Loren D. Enochson and others. Dec 62, 501p. incl. illus. tables, 47 refs.
(Contract AF 33(657)7459, Proj. 1370)
(ASD TDR 62-973) Unclassified report

DESCRIPTORS: *Aerodynamic characteristics, *Vibration, Aircraft, Spacecraft, Experimental data, Statistical distributions, Statistical processes, Statistical tests, Analysis of variance, Statistical functions, Sampling, Oscillation, Simulation, Airframes, Statistical analysis, Measurement.

Results from theoretical and experimental studies on random signal estimation and measurement pertinent to flight vehicle vibration problems are presented. Part I, Theoretical Studies of Random Signal Estimation, develops new basic mathematical ideas for nonstationary data analysis. Part II, Experimental Studies of Random Signal Measurements, investigates previously derived theoretical expressions for expected measurement uncertainties in zero crossing estimates, power spectra (mean square) estimates, and amplitude probability density estimates. (Author)

AD-297 064 Div. 9, 25
(TISTM/REB) OTS price $5.60

Mechanical Technology, Inc., Latham, N. Y.
TWO PHASE FLOW IN THRUST BEARINGS. PART II. ANALYSIS OF THE REGION NEAR THE AXIS OF ROTATION,
by I. Beretsky. 31 Dec 62, 30p. illus. (Rept. no. MTI-62TR16)
(Contract Nonr-373100)
Unclassified report

DESCRIPTORS: *Thrust bearings, *Condensation, *Vapors, *Lubricants, Fluid flow, Fluid mechanics, Temperature, Vaporization.

The two-phase thrust bearing is analyzed near the axis of rotation where the radial pressure gradient is non zero and the viscosity is negligible for the gaseous phase. The analysis agrees with the previous work by Sparrow and Gregg (Trans of ASME, Series E, 81:113-120, 1959) for condensate thickness for the limiting case of zero pressure gradient. With radial pressure gradients, the condensate thickness is seen to have the chance of reevaporation due to the change of vapor temperature in the radial direction. The sensitivity of the condensate thickness to temperature difference is noted. (Author)

AD-297 102 Div. 9
(TISTA/GEC) OTS price $2.60

Army Missile Command, Redstone Arsenal, Huntsville, Ala.
TORQUE REQUIREMENTS OF AN IN-FLIGHT SPIN MECHANISM FOR A PRESCRIBED MISSILE ROTATIONAL VELOCITY,
by J. S. Bennett, K. N. Letson and O. G. Wilkerson. 12 Nov 62, 22p. incl. illus. 7 refs. (Rept. no. RS-TR-62-6)
Unclassified report

DESCRIPTORS: *Rockets, *Torque, Velocity, Thrust, Roll, Design, Mathematical analysis, Equations, Motion, Stabilization systems, Exhaust gases, Deflection, Spin stabilized ammunition, Spin.

A method was developed to calculate the torque required to spin a small missile to a specified rotational velocity. The origin of the torque forces is assumed to be a mechanical fixture which utilizes the missile motor exhaust and, therefore, operates as an in-flight spin mechanism. The essential missile parameters are discussed and incorporated in a mathematical treatment which results in algebraic formulae for the calculation of torque. (Author)

AD-297 175 Div. 9
(TISTA/GEC) OTS price $1.60

University of Southern Calif. Engineering Center, Los Angeles.
DESCRIPTION OF AN EXPERIMENTAL INVESTIGATION OF THE EFFECTS OF BOUNDARY LAYER BLEED ON SHOCK WAVE-BOUNDARY LAYER INTERACTION,
by John B. Wainwright. 28 Dec 62, 17p. incl. illus. 3 refs. (USCEC rept. no. 65-35)
Unclassified report

DESCRIPTORS: *Boundary layer control, *Boundary layer, Wedges, Wind tunnel models, Model tests, Supersonic flow, Duct inlets, Ramjet inlets, Turbojet inlets, Supersonic characteristics, Suction slots, Shock waves.

An investigation was made of the effects of suction on shock wave-boundary layer interaction characteristics, with the view of establishing engineering design criteria for supersonic air-induction systems. Tests were conducted at Mach 2.58 and at Mach 3.0 - 3.5. The boundary layers were developed on the upper surface of a 6 degree wedge of trapezoidal plan form. The wedge had a leading-edge span and over-all length of 16.5 inches, and a 20 degree tip-rake angle. Various porous plates were investigated. (Author)

AD-297 197 Div. 9
(TISTA/LSK) OTS price $6.60

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
THE SHOCK SHAPE AND SHOCK DETACHMENT DISTANCE FOR SPHERES AND FLAT-FACED BODIES IN LOW-DENSITY, HYPERVELOCITY, ARGON FLOW,
by A. B. Bailey and W. H. Sims. Feb 63, 57p. incl. illus. tables, 32 refs. (AEDC TDR 63-21) (Contract AF 40(600)1000, Proj. 8953)
Unclassified report

DESCRIPTORS: *Spheres, *Blunt bodies, Superaerodynamics, Hypersonic characteristics, Boundary layer, Pressure, Model tests, Wind tunnel models, Argon, Shock waves.

An experimental investigation was made to determine the pressure distribution, shock shape, and shock detachment distance for spheres and the latter two characteristics for flat-faced bodies in a heated argon flow. The modified Newtonian approximation for the pressure distribution, which is strictly an empirical relationship, gives good results when applied to the first 60 degrees of a hemisphere under conditions where the body boundary layer and the shock layer merge. The natural flow visualization produced as a result of the high total temperature and consequent excitation of the argon enabled this study to be made. Photographs taken of the shocks generated by a series of spheres and flat-faced bodies were analyzed with a photo-densitometer to determine the shock shape and shock detachment distance. The blast analogy predicts a difference in the shape of shocks in argon and air at high Mach numbers and Reynolds numbers. An empirical relationship proposed by love was used to calculate the shock shape in air for Mach numbers corresponding to those of the present investigation. (Author)

AD-297 274 Div. 9, 15
(TISTP/MB) OTS price $6.60

Notre Dame U., Ind.
ON THE CALCULATION OF UNSTEADY INCOMPRESSIBLE LAMINAR BOUNDARY LAYERS OVER ARBITRARY CYLINDERS,
by Kwang-Tzu Yang. Nov 62, 73p. incl. illus. tables, 32 refs. (Technical note no. 62-21) (Contract Nonr-162311)
Unclassified report

DESCRIPTORS: *Laminar boundary layer, Boundary layer, Fluid flow, Cylindrical bodies, Hydrodynamics, Partial differential equations, Equations, Stability.

This report deals with the calculation of unsteady laminar boundary layers over arbitrary cylinders in an incompressible flow. The calculation procedure is based on an improved integral solution to the governing unsteady boundary-layer equations. The essential feature of this improved solution is to treat the usual integral solution as a first approximation, which is then used to linearize the governing equation in such a way that improved unsteady velocity profiles in the boundary layer are readily obtained. The integral solution is first described in detail, based on two assumed types of profiles, one being the well-known Pohlhausen's fourth-degree polynomial, and the other, an exponential function containing one arbitrary parameter. (Author)

AD-297 807 Div. 9, 1
(TISTA/FRL) OTS price $5.60

Bureau Technique Zborowski, Paris (France).
THEORETICAL INVESTIGATION AND CONTROL BY MEASURING TESTS ON THE BEHAVIOR OF THE THREE-DI-

MENSIONAL TURBULENT BOUNDARY-LAYER ON AN ANNULAR WING AT VARIOUS INCIDENCES.
Interim technical rept. no. 2,
by Ernest A. Eichelbrenner, Serge Angioletti and others. 15 Sep 62, 49p.
(Contract N62558-2526)
Unclassified report

DESCRIPTORS: *Ring wings, Pressure, Theory, Energy, Equations, Separation, Attachment, Wind tunnel models, Model tests, Mathematical analysis, Turbulence, Laminar boundary layer.

AD-297 809 Div. 9
(TISTA/LSK) OTS price $4.60

Bureau Technique Zborowski, Paris (France).
THEORETICAL INVESTIGATION AND CONTROL BY MEASURING TESTS ON THE BEHAVIOR OF THE THREE-DIMENSIONAL TURBULENT BOUNDARY LAYER ON AN ANNULAR WING AT VARIOUS INCIDENCES.
Interim technical rept.,
by Ernest A. Eichelbrenner, Serge Angioletti and others. Dec 61, 48p.
(Contract N62558-2526)
Unclassified report

DESCRIPTORS: *Ring wings, *Turbulent boundary layer, Theory, Boundary layer control, Mathematical analysis, Experimental data, Separation, Attachment.

AD-297 847 Div. 9
(TISTA/FRL) OTS price $7.60

Hydrodynamics Lab., Calif. Inst. of Tech., Pasadena.
AN EXPERIMENTAL INVESTIGATION OF A FULLY CAVITATING TWO-DIMENSIONAL FLAT PLATE HYDROFOIL NEAR A FREE SURFACE,
by Thomas Emmett Dawson and E. R. Bate, Jr.
Oct 62, 66p. (Rept. no. E-118.12)
(Contract N123(60530)31686A)
Unclassified report

DESCRIPTORS: *Hydrofoils, *Cavitation, *Flat plate models, Pressure, Gas flow, Volume, Model tests, Fluid dynamic properties, Hydrodynamics.

AD-297 895 Div. 9
(TISTP/MB) OTS price $3.60

Harry Diamond Labs., Washington, D. C.
FLUID AMPLIFICATION. 5. JET ATTACHMENT DISTANCE AS A FUNCTION OF ADJACENT WALL OFFSET AND ANGLE,
by Sheldon G. Levin and Francis M. Manion.
31 Dec 62, 45p. incl. illus. (Rept. no. TR-1087)
(HDL Proj. 31100)
Unclassified report

DESCRIPTORS: *Jets, Fluid mechanics, Subsonic flow, Boundary layer, Surfaces, Computers, Mathematical studies, Theory, Turbulent boundary layer, Fluid flow.

Attachment of a submerged, incompressible, two-dimensional, turbulent jet to an adjacent straight wall (Coanda effect) is analyzed. Parametric equations are developed that predict the point at which the jet attaches as a function of wall angle and offset distance. Computer solutions were obtained for several sets of conditions. Experiments were conducted with both air and water jets at Mach 0.5 equivalent, and results agree well with corresponding computer solutions when the jet spread parameter is also treated as a function of offset distance and wall angle. The equations provide an analytic method, independent of the particular fluid, for predicting the attachment distance, and should be helpful in designing elements based on the Coanda effect; e.g., the fluid flip-flops or bistable elements. (Author)

AD-297 904 Div. 9, 25
(TISTP/JW) OTS price $1.60

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
SOLUTION FOR THE TRANSIENT ONE-DIMENSIONAL HEAT CONDUCTION IN AN INFINITE SLAB,
by John T. Miller. Mar 63, 12p. (Rept. no. AEDC-TDR-63-43)
(Contract AF 40(600)1000)
Unclassified report

DESCRIPTORS: *Heat transfer, Boundary layer, Temperature, Mathematical analysis, Solids.

AD-297 907 Div. 9,
(TISTM/RGR) OTS price $10.10

Oklahoma U. Research Inst., Norman.
HIGH-SPEED FLOW THROUGH POROUS MEDIA.
Interim technical rept. no. 1 on Pressure Wave Interactions in Porous Media,
by Eric Weger and Edward F. Blick. Jan 63, 112p.
(Grant DA-ORD-31-124-61G74)
(AROD rept. no. 3005:4) Unclassified report

DESCRIPTORS: *Fluid flow, *Gas flow, *Models (Simulations), *Mathematics, Porous materials, Engineering, Velocity, Viscosity, Turbulence, Computer logic, Simulation, Programming (Computers).

AD-297 935 Div. 9, 30
(TISTA/GEC) OTS price $23.50

Diamond Ordnance Fuze Labs., Washington, D. C.
PROCEEDINGS OF THE FLUID AMPLIFICATION SYMPOSIUM. SPONSORED BY THE DIAMOND ORDNANCE FUZE LABORATORIES, 2, 3, AND 4 OCTOBER 1962.
VOLUME I.
Oct 62, 1v.
Unclassified report

DESCRIPTORS: *Symposia, *Fluid flow, Compressible flow, Jet mixing flow, Jets, Turbulence, Pneumatic systems, Army research, Digital systems, Control systems.

AD-297 980 Div. 9
(TISTA/GEC) OTS price $1.60

Little, Arthur D., Inc., Cambridge, Mass.
DEVELOPMENT OF AN EXPLOSIVE SYSTEM FOR ACCELERATING A METAL PELLET.
Final rept.,
by Wendell G. Sykes and Edward A. Vrablik.
30 Jan 63, 11p.
(Contract AF 19(604)7480, Proj. 7667)
(AFCRL 63-246) Unclassified report

DESCRIPTORS: *Hypervelocity projectiles, *Pellets, Stainless steel, Tests, Meteorites, Simulation, Charges (Explosive), Propellants, Acceleration.

Division 10 - FUELS AND COMBUSTION

AD-298 064 Div. 9, 25
(TISTP/JW) OTS price $3.60

Frick Chemical Lab., Princeton U., N. J.
NAVIER-STOKES CALCULATIONS OF ARGON SHOCK WAVE STRUCTURE,
by L. M. Schwartz and D. F. Hornig. 1 Mar 63, 29p. (Technical rept. no. 5)
(Contract Nonr-185824, Proj. NR-061-041)
Unclassified report

DESCRIPTORS: *Shock waves, Temperature, Viscosity, Density, Argon.

AD-298 081 Div. 9, 25
(TISTM/ODN) OTS price $7.60

AeroChem Research Labs., Inc., Princeton, N. J.
CONVECTIVE DIFFUSION AS AN INTRUDER IN KINETIC STUDIES OF SURFACE CATALYZED REACTIONS,
by Daniel E. Rosner. 4 Mar 63, 39p. illus. refs.
(Contracts AF 49(638)1138 and AF 49(638)1195)
Unclassified report

Invited paper to be presented at the Propellants and Combustion Session of the American Institute of Aeronautics and National Summer Meeting, 16-19, June 1963, Los Angeles, California.

DESCRIPTORS: *Catalysis, *Reaction kinetics, Diffusion, Laminar boundary layer, Fluid flow, Turbulent boundary layer, Configuration, Differential geometry, Surfaces, Chemical reactions.

AD-298 110 Div. 9
(TISTA/GEC) OTS price $4.60

Princeton U., N. J.
A PRELIMINARY STUDY OF THE RATE OF GROWTH AND DECAY OF BLOWING-JET-INDUCED CIRCULATION ON TWO-DIMENSIONAL PROFILES,
by D. C. Hazen and F. C. Karins. Dec 62, 24p. illus. tables. (Rept. no. 632)
Unclassified report

DESCRIPTORS: *Airfoils, Wind tunnel models, Smokes, Aerodynamic characteristics, Jets, Motion picture photography, Test methods, Angle of attack, Slotted flaps, Boundary layer control, Gas flow.

AD-298 128 Div. 9, 4
(TISTM/RGR) OTS price $3.60

Aerospace Corp., Los Angeles, Calif.
CHEMICALLY FROZEN BOUNDARY LAYER WITH SURFACE REACTIONS BEHIND A STRONG MOVING SHOCK,
by P. M. Chung. 16 Nov 62, 32p. (Rept. no. TDR-169(3230-12)TN-3)
(Contract AF 04(695)169)
(SSD TDR 62-164) Unclassified report

DESCRIPTORS: *Shock waves, *Shock tubes, Surface properties, Gas flow, Gases, Laminar boundary layer, Fluid dynamic properties, Theory, Chemical reactions, Boundary layer.

10. FUELS AND COMBUSTION

AD-297 032 Div. 10, 4, 26
(TISTM/EJH) OTS price $13.50

Aerojet-General Nucleonics, San Ramon, Calif.
HYDRAZINE PROCESS DEVELOPMENT.
Interim technical engineering rept. no. 7, Nov 62-Jan 63, by H. T. Watanabe, L. G. Carpenter and others. Jan 63, 193p. incl. illus. tables, 6 refs. (Rept. no. AN-847)
(Contract AF 33(600)42996)
(ASD TR 7-840A, vol. 8)
Unclassified report

DESCRIPTORS: *Liquid rocket propellants, *Liquid rocket fuels, Processing, Manufacturing methods, Industrial production, Nuclear engineering, Radiochemistry, Fission product activity, Homogenous reactors, Nitrogen compounds, Uranium compounds, Dioxides, Radioactive isotopes, Industrial equipment, Colloids, Electron microscopy, Production.

The fissiochemical process approach is being used to develop, design, construct, and operate a continuous, in-reactor hydrazine production loop. This report discusses separation of ammonia-hydrazine mixtures, long-term chemical changes in a fissiochemical environment, slurry sampling, sol formation, in-reactor loop fabrication, flux run results, loop-sampling-technique development, N-F-O irradiations, urea additive effects, and parametric reactor systems analysis. (Author)

AD-297 040 Div. 10, 1
(TISTA/FRL) OTS price $9.60

Aerojet-General Corp., Azusa, Calif.
PROTOTYPE PROPELLANT-TESTING SYSTEM. PHASES I AND II - FEASIBILITY STUDY AND PRELIMINARY DESIGN.
Final rept., 14 May-30 Nov 62,
by R. C. Adrian and H. C. Edgington. Feb 63, 119p. incl. illus. tables, 117 refs. (Rept. no. LAF-12-8)
(Contract AF 04(611)8196, Proj. 3850)
(RTD-TDR 63-3) Unclassified report

DESCRIPTORS: *Liquid rocket propellants, Storage, Containers, Contamination, Pipes, Feasibility studies, Design, Construction, Materials, Instrumentation, Tests, Test equipment, Compatibility, Valves, Pumps, Seals, Couplings, Handling.

The feasibility of constructing a test system for studying dynamic effects in liquid-propellant streams was examined and a prototype system was designed that is acceptable for use with storable, corrosive, or cryogenic fuels and oxidizers. Recommendations are made for on-stream analyzers suitable for the monitoring of a wide range of physical and chemical properties of dynamic systems. A contaminant-addition system was designed to provide propellant of a known contamination level for subsequent tests. (Author)

AD-297 085 Div. 10
(TISTM/EJH) OTS price $1.60

Bureau of Mines, Pittsburgh, Pa.
RESEARCH ON THE FIRE AND EXPLOSION HAZARDS ASSOCIATED WITH NEW LIQUID PROPELLANTS.
Final progress rept. no. 9, 1 May-31 Aug 61, by David Burgess, Joseph Grumer and Michael G. Zabetakis. 31 Aug 61, 18p. incl. illus. tables.
Unclassified report

DESCRIPTORS: *Liquid rocket propellants, *Liquid rocket fuels, *Combustion, *Organic compounds, Ignition, Flames, Detonations, Hazards, Fires, Foams, Water, Sprays, Liquid rocket oxidizers, Fire extinguishers, Heat transfer, Nitric acid, Tetroxides, Nitrogen compounds, Rocket propellants.

Contents:
Phase I: Ignition
Spontaneous ignition
Phase II: Flame propagation, pressure rise rates, and detonability

Phase III: Liquid burning and extinguishment
Extinguishment of UDMH fires by high expansion foams
Burning rates of MAF-1 and MAF-3 in wind
Comparison of convective and radiative heat transfer

AD-297 153 Div. 10
(TISTM/ODN) OTS price $6.60

Naples U. (Italy).
TEST OF DETERGENT ADDITIVES FOR DIESEL FUELS.
Final technical rept., 1 Jan 61-30 June 62.
30 June 62, 29p. illus. table.
(Contract DA 91-591-EUC-1661)
Unclassified report

DESCRIPTORS: *Fuel oil, *Fuel additives, Test methods, Tests, Instrumentation, Test equipment, Deposits, Oscillographs, Injectors, Diesel engines.

An experimental test method to ascertain on a laboratory Petter AV-1 test engine the efficacy of detergent additives for diesel fuels was developed. The method consists of a standard test of 36 hours duration, executed on the test engine fed with a diesel fuel to which has been added the detergent additive to be investigated. The analysis of test results, intended as evaluation of the deposits formed on some established engine members, will furnish, by comparison with the results of a similar test conducted with the same fuel without additive, the necessary indications to evaluate the detergency of the tested additive. (Author)

AD-297 333 Div. 10, 14
(TISTM/ODN) OTS price $1.10

General Dynamics/Convair, San Diego, Calif.
CHEMICAL ANALYSIS AND REMOVAL OF SOLID ROCKET PROPELLANT RESIDUES. MODEL F-102.
Report on Material - Corrodents and Corrosion Products - Solid Rocket Propellant Residues. Composition and Removal,
by G. N. Kruse, E. E. Keller, and W. M. Sutherland. 2 Nov 59, 7p. tables (Rept. no. 8926-106)
(Contract AF 33(657)8926)
Unclassified report

DESCRIPTORS: *Solid rocket propellants, *Combustion deposits, *Cleaning compounds, Carbon-removing compounds, Organic solvents, Inorganic compounds, Solutions, Combustion, Tests, Organic materials, Oxides, Carbon, Magnesium, Magnesium compounds, Phosphoric acids, Chemical analysis, Materials.

Solid propellant combustion products resulting from firing 2.5 inch rockets from F-102 airplanes were found to consist of carbon, various organic materials, and magnesium or magnesium oxide. Twenty-nine materials were tested to determine their efficacy in removing heavy combustion product deposits. Three of these materials, Rocket Cleaners X2-6, X2-9 and X2-11, were found suitable for effective and thorough combustion product removal. (Author)

AD-297 507 Div. 10, 4
(TISTM/ODN) OTS price $1.60

Texaco Experiment, Inc., Richmond, Va.
COMBUSTION OF ELEMENTAL BORON.
Quarterly summary rept., Aug-Oct 62,
by U. V. Henderson, Jr., Harry P. Woods, and Genevieve M. Poplin. 1 Nov 62, 12p. (Technical memo. no. 1384; Rept. no. EXP-223)
(Contract Nonr-188300)
Unclassified report

DESCRIPTORS: *Single crystals, *Boron, Fluorine, Gases, Chemical reactions, Balances, Reaction kinetics, High-temperature research, Pressure, Test equipment, Combustion.

AD-297 566 Div. 10, 4
(TISTM/ODN) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
THE BURNING OF AMMONIUM PERCHLORATE,
by L. D. Romodanova and V. I. Roshchupkin.
18 Jan 63, 4p. incl. illus. 4 refs. (Trans. no. FTD-TT-62-1561 from Zhurnal Fizicheskoy Khimii 36:7, pp. 1554-1555, 1962)
Unclassified report

DESCRIPTORS: *Ammonium compounds, *Pyrolysis, Crystals, Decomposition, Perchlorates

AD-297 962 Div. 10
(TISTM/RGR) OTS price $6.60

Thiokol Chemical Corp., Elkton, Md.
A RESEARCH STUDY TO ADVANCE THE STATE-OF-THE-ART OF SOLID PROPELLANT GRAIN DESIGN.
Quarterly progress rept. no. 2, 1 Oct 62-1 Jan 63,
by Mary Pase, W. G. Andrews and others.
8 Mar 63, 58p. (Rept. no. E13-63)
(Contract AF 33(616)6530, Proj. 3059)
Unclassified report

DESCRIPTORS: *Rocket propellant grains, *Combustion, Programming (Computers), Heat transfer, Rocket motors, Difference equations, Boundary layer, Stresses, Laboratory equipment, Deformation, Solid rocket propellants, Design.

AD-298 106 Div. 10, 27, 12
(TISTM/AMS) OTS price $1.60

Princeton U., N. J.
SOLID PROPELLANT COMBUSTION INSTABILITY.
Technical summary rept., 1 May-30 Nov 62,
by R. H. Woodward Waesche and Joseph Wenograd.
29 Jan 63, 12p. illus. (Aeronautical engineering rept. no. 635a)
(Grant AF-AFOSR-62-460)
Unclassified report

DESCRIPTORS: *Solid rocket propellants, *Combustion, *Optical analysis, Oscillation, Pressure, Propellants, Combustion chambers, Entropy, Acoustic properties, Acoustic equipment, Gas flow, Photographic analysis, Temperature, Thermal radiation, Binders, Spectroscopy, Combustion deposits.

11. GROUND TRANSPORTATION EQUIPMENT

No Entries

12. GUIDED MISSILES

AD-297 093 Div. 12
(TISTE/CAM) OTS price $16.00

RCA Defense Electronic Products, Burlington, Mass.
MULTISYSTEM TEST EQUIPMENT.
Quarterly interim technical rept. no. 3, 1 Oct-31 Dec 62.
15 Feb 63, 250p. incl. illus. tables (Rept. no. CR-63-547-31)
(Contract DA 36-034-ORD-3650)
Unclassified report

DESCRIPTORS: *Test equipment (Electronics), *Test sets, *Ground support equipment, *Maintenance equipment, *Test facilities, Circuits, Gates circuits, Trigger circuits, Documentation, Calibration, Power supplies, Hydraulic servomechanism, Control systems, Cleaning, Contamination, Heating, Coolants, Cooling and ventilation equipment, Digital computers, Standards, Operations, Reliability, Safety, Guided missiles.

Work was concentrated on the multisystem test equipment (MTE) design and development effort. The system design effort placed emphasis on the completion of group and assembly specifications and finalizing shelter layouts. In the equipment design and development area, design of subsystems for the electronic test set was completed and detailed development initiated. A study of hydraulic fluid contamination effects both within the HTS and Mauler was completed. (Author)

AD-297 233 Div. 12, 9
(TISTA/FRL) OTS price $7.60

AeroChem Research Labs., Inc., Princeton, N. J.
RADIATION COOLING OF AERODYNAMICALLY HEATED SURFACES AT HIGH MACH NUMBERS,
by Daniel E. Rosner. 28 Jan 62, 46p. illus. tables, 69 refs. (Rept. no. TP-60)
(Contract AF 49(638)1138)
Unclassified report

DESCRIPTORS: *Cooling, *Reentry vehicles, *Boost-glide vehicles, Aerodynamic configurations, Heat transfer, Rocket noses, Design, Surface temperature, Aerodynamic heating, High altitude, Boundary layer, Bibliographies, Velocity, Flat plate models, Hypersonic characteristics, Thermochemistry, Catalysis, Equations, Theory, Nose cones, Recombination reactions, Thermal radiation.

Several aspects of radiation cooling are discussed; particularly those associated with the occurrence of surface catalyzed atom recombination at high Mach numbers. An analogy between radiation cooling and chemical surface catalysis is explored and the dominant effects resulting from interactions between these two processes are illustrated using simple mathematical models which serve to single out the important non-dimensional parameters. In connection with flight applications, altitude-velocity maps are presented which provide an over-all picture of the regimes in which chemical nonequilibrium effects should be noticeable. Several unexplored areas of potential interest in the design of hypersonic lifting vehicles are outlined and related to the available literature. Not all of these areas deal with thermochemical effects. Many problems remain unsolved, as illustrated by a brief discussion of the radiation-cooled flat plate. (Author)

AD-297 236 Div. 12
(TISTA/LSK) OTS price $2.60

Army Missile Command, Redstone Arsenal, Huntsville, Ala.
MISSILE ATTITUDE DETERMINATION USING MAGNETOMETERS WITH SUN AND EARTH SENSORS,
by C. F. Asquith and W. F. Baxter. 31 Dec 62, 23p. incl. illus. (Rept. no. RG-TR-62-5)
(Proj. 1-B-2-7919113D-678)
Unclassified report

DESCRIPTORS: *Guided missiles, Infrared radiation, Sun, Earth, Optical scanning, Infrared scanning, Attitude control systems, Attitude indicators, Magnetometers.

A study was conducted to define several methods for determining missile attitude. The methods described are based on the use of on-board equipment which responds to references present in nature rather than on-board equipment which actually establishes a reference. The sensor combinations dealt with are the magnetometer-sun sensor and magnetometer-earth sensor combinations. (Author)

AD-297 336 Div. 12, 17
(TISTA/FRL) OTS price $4.60

Aerojet-General Corp., Sacramento, Calif.
EVALUATION OF HIGH-NICKEL STEEL FOR APPLICATION IN LARGE BOOSTER MOTOR FABRICATION.
Quarterly progress rept. no. 1, 1 July-30 Sep 62. Oct 62, 48p. incl. illus. tables (Rept. no. 0705-82Q-1)
(Contract AF 33(657)8740)
Unclassified report

DESCRIPTORS: Rocket motors (Solid propellant), *Booster rockets, Steel, Nickel alloys, Mechanical properties, Metallurgy, Welding, Welding rods, Melting, Hot working, Materials, Additives, Metal plates, Sheets, Rocket cases.

The mechanical and metallurgical properties and weldability of 18% nickel alloy steels for booster motor fabrication are reported. The information relates specifically to the results of mill processing evaluations and the initial studies to establish the mechanical and metallurgical properties of parent-metal 18% nickel alloy steels. In addition, the results of preliminary studies to determine the effects of different weld-wire compositions on weldability and resultant weld properties are presented. (Author)

AD-297 396 Div. 12, 33, 26
(TISTW/PCR) OTS price $1.60

Naval Missile Center, Point Mugu, Calif.
CONCEPT FOR SEA LAUNCHING MISSILES AND TRANSPORTING LARGE BOOSTERS USING A TUBE,
by N. Kamalian. 15 June 62, 13p. incl. illus.
(Miscellaneous Publication no. NMC-MP-62-4)
Unclassified report

DESCRIPTORS: *Launching sites, *Guided missile launchers, *Booster rockets, Launching, Configuration, Rocket motors (Liquid propellant), Rocket motors (Solid propellant), Design, Rocket propellants, Casting, Aging (Materials), Towed bodies, Underwater, Pictures, Oceans, Pipes, Transportation.

The purpose of this report is to introduce a preliminary concept of a system which will further enhance the feasibility and versatility of the sea-launch concept. The proposed system makes it possible to take almost any missile,

regardless of size and type of propellant, and launch it from the sea. The system involves enclosing the missile in a reusable capsule or tube which can then be towed underwater, erected to the vertical, and the missile launched from this tube. Besides the launching of missiles, a modified tube can also be used for transporting large boosters. In the case of solid-propellant boosters, the motor can even be cast, cured, and carried away all in the same tube. (Author)

AD-297 504 Div. 12
(TISTA/GEC) OTS price $1.50

Directorate of Advanced Systems Planning, Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio.
ORBITAL MANEUVERS WITH FINITE THRUST ROCKETS.
Final rept., Apr 61-Aug 62,
by Robert W. Roig. Jan 63, 50p.
(Proj. 5401)
(ASD TDR 62-860) Unclassified report

DESCRIPTORS: *Satellites (Artificial), Computers, Acceleration, Circular orbit trajectories, Maneuverability, Thrust, Mathematical analysis, Transfer trajectories, Vernier rocket motors.

AD-297 786 Div. 12
(TISTA/GEC) OTS price $13.00

Westinghouse Electric Corp., Baltimore, Md.
MAGNETIC TORQUERS FOR SPACE VEHICLE CONTROL.
Final rept., 15 Mar-15 Nov 62,
by J. Braumiller, G. E. Lynn and others. Jan 63, 172p.
(Contract AF 33(657)8190, Proj. 8225)
(ASD TDR 63-74) Unclassified report

DESCRIPTORS: *Satellites (Artificial), *Attitude control systems, Satellite attitude, Spacecraft, Torque, Ferromagnetic materials, Terrestrial magnetism, Magnetic fields, Magnetic coils.

AD-297 839 Div. 12
(TISTA/FRL) OTS price $8.10

New Mexico U., Albuquerque.
A STUDY OF RADIANT HEAT TRANSFER IN A LUNAR SIMULATION CHAMBER,
by Maurice W. Wildin. Jan 63, 79p.
(ORA 63-2) Unclassified report

DESCRIPTORS: *Lunar environment, *Space capsules, Cylindrical bodies, Model tests, Analysis, Heat transfer, Emissivity, Solar radiation, Spacecraft cabins, Differential equations, Integral equations, Temperature control, Simulation, Thermal conductivity.

AD-297 848 Div. 12
(TISTW/RD) OTS price $4.60

Naval Weapons Lab., Dahlgren, Va.
TERRIER STRUCTURAL FIRING TEST ABOARD THE USS BAINBRIDGE (DLG(N)-25).
Final rept.,
by P. P. Wiggins, T. I. Dodson and others.
14 Feb 63, 1v. (NWL rept. no. 1843)
Unclassified report

DESCRIPTORS: *Guided missiles (Surface-to-air), *Launching, *Guided missile launchers, Ship structural components, Damage, Blast, Stresses, Pressure, Poisonous gases, Safety, Shipborne, Hazards.

AD-297 859 Div. 12
(TISTA/LSK) OTS price $8.60

Aerospace Corp., Los Angeles, Calif.
SATELLITE ATTITUDE CONTROL USING THE EARTH'S MAGNETIC FIELD,
by R. E. Toepfer. 20 Aug 62, 83p. (Rept. no. TDR-169(3540-20)TN-1)
(Contract AF 04(695)169)
(SSD TDR 62-88) Unclassified report

DESCRIPTORS: *Satellites (Artificial), *Attitude control systems, Torque, Magnetic fields, Mathematical analysis, Terrestrial magnetism.

AD-297 866 Div. 12
(TISTW/RD) OTS price $7.60

Naval Missile Center, Point Mugu, Calif.
METHODS FOR ESTABLISHING NOISE LEVELS AT VARIOUS DISTANCES FROM A MISSILE FIRING AND EFFECTS OF THESE NOISE LEVELS ON STRUCTURES, EQUIPMENT, AND PERSONNEL,
by J. B. Overton. 22 Aug 60, 73p. (Technical memo. no. NMC-TM-60-33)
Unclassified report

DESCRIPTORS: *Launching, *Rocket motor noise, *Sound, *Guided missiles, Personnel, Structures, Launching sites, Safety, Pressure, Acoustics, Hazards, Radiation effects.

AD-297 871 Div. 12
(TISTA/FRL) OTS price $6.60

Aerospace Corp., Los Angeles, Calif.
GRAVITY GRADIENT EXCITATION OF A ROTATING CABLE-COUNTERWEIGHT SPACE STATION IN ORBIT,
by V. Chobotov. 11 Jan 63, 59p. (Rept. no. TDR-169(3530-20)TN-1)
(Contract AF 04(695)169)
(SSD TDR 63-17) Unclassified report

DESCRIPTORS: *Space stations, Weight, Rotation, Cables (Mechanical), Integration, Motion, Oscillation, Stability, Vibration, Damping, Analysis, Equations, Simulation, Orbital trajectories, Gravity (Artificial).

AD-297 937 Div. 12
(TISTA/LSK) OTS price $4.60

Aeronutronic, Newport Beach, Calif.
LUNI-SOLAR PERTURBATIONS OF THE ORBIT OF AN EARTH SATELLITE,
by Paul E. Koskela and Jeannine L. Arsenault.
15 Sep 62, 46p. (Technical rept. no. U-1830)
(Contract AF 19(604)7375)
(ESD TDR 62-226) Unclassified report

DESCRIPTORS: *Satellites (Artificial), *Orbital trajectories, Celestial mechanics, Equations, Statistical analysis, Mathematical analysis, Drag, Gravity, Moon, Sun, Perturbation theory.

AD-297 942 Div. 12
(TISTA/GEC) OTS price $4.60

Aeronutronic, Newport Beach, Calif.
ORBITAL ERROR ANALYSIS,
by Tom L. Johnston and Edward W. Onstead.
15 Sep 62, 43p. (Rept. no. U-1831)
(Contract AF 19(604)7375)
(ESD TDR 62-227) Unclassified report

DESCRIPTORS: *Satellites (Artificial), Errors, Statistical analysis, Monte Carlo method, Analysis of variance, Determination, Position finding, Orbital trajectories.

Division 13 - INSTALLATIONS AND CONSTRUCTION
Division 14 - MATERIALS (NON-METALLIC)

AD-297 977 Div. 12
(TISTW/RD) OTS price $1.60

Ogden Air Materiel Area, Hill Air Force Base, Utah.
SERVICE LIFE TEST OF TX53 ACTUATOR VALVE - IM99A.
Airmunitions test rept.,
by Don F. Woods and Jesse S. Calloway, Jr.
Feb 63, 10p. (Rept. no. OOY TR 63-5)
Unclassified report

DESCRIPTORS: *Valves, *Explosive actuators, Tests, Life expectancy, Guided missiles (Surface to air).

AD-298 062 Div. 12
(TISTA/FRL) OTS price $4.00

Systems Technology Inc., Inglewood, Calif.
ENGINEERING ANALYSIS METHODS FOR LINEAR TIME VARYING SYSTEMS.
Final rept., Apr 61-Jan 62 on Investigation of Space Vehicle Thrust Vector Control Systems Described by Time Varying Coefficient Linear Differential Equations,
by Dunstan Graham, Eugene J. Brunelle, Jr. and others. Jan 63, 259p. illus.
(Contract AF 33(616)7998, Proj. 8219)
(ASD TDR 62-362) Unclassified report

DESCRIPTORS: *Guided missiles, Motion, Equations, Time, Differential equations, Dynamics, Rendezvous trajectories, Analysis, Attitude control systems, Integral equations, Theory, Yaw, Stability, Linear systems, Spacecraft, Flight control systems.

13. INSTALLATIONS AND CONSTRUCTION

AD-297 356 Div. 13
(TISTP/WH) OTS price $7.60

Aerospace Information Div., Washington, D. C.
SOVIET LITERATURE ON PROTECTIVE STRUCTURES AND COMPONENTS.
Quarterly rept. no. 6, 17 July-28 Sep 62.
8 Jan 63, 75p. incl. illus. table, 25 refs.
(AID rept. no. 62-198)
Unclassified report

DESCRIPTORS: *Ground support equipment, Transportation, Railroads, Locomotives, Vehicles.

AD-297 771 Div. 13, 15, 20
(TISTB/CCH) OTS price $4.60

Stanford Research Inst., Menlo Park, Calif.
FEASIBILITY STUDY OF AN EXPERIMENTAL APPARATUS FOR UNIDIMENSIONAL STRESS PROPAGATION IN SOIL.
Final rept., pt. 2,
by H. W. Kriebel. 21 Feb 62, 43p.
(Contract DA 49-146-xz-018, Proj. PHU-2917)
(DASA 1266, pt. 2) Unclassified report

DESCRIPTORS: *Underground structures, Nuclear explosions, Rock, Soils, Mathematical analysis, Design.

AD-297 927 Div. 13, 30, 1/
(TISTM/EJL) OTS price $6.60

Massachusetts Inst. of Tech., Cambridge.
DYNAMIC SHEAR STRENGTH OF CONCRETE KEYS,
by Indravadan Shah. Jan 63, 61p. (Rept. no. R63-5)
(Contract DA 49-146-xz-061)
(DASA 1339) Unclassified report

DESCRIPTORS: *Structures, *Structural parts, *Shear stresses, *Concrete, Blast, Loading (Mechanics), Test methods, Casting, Failure (Mechanics), Materials, Mechanical properties, Test equipment, Joints.

AD-298 141 Div. 13
(TISTM/AM) OTS price $1.50

Surface Processes Research and Development Corp., Dallas, Pa.
CATALYST AND ELECTRODE STRUCTURE DEVELOPMENT FOR HYDROCARBON FUEL CELLS.
Final rept.
1 Nov 62, 31p. incl. illus. tables, 11 refs.
(Contract DA 44-009-eng-5090)
Unclassified report

DESCRIPTORS: *Fuel cells, *Catalysts, *Electrodes, Iridium, Platinum, Rhodium, Impregnation, Porous materials, Experimental data, Chemisorption, Electrolytes, Hydrocarbon, Transition elements, Carbon.

An investigation was made of catalysts from the Group-_ transition metals of the fifth and sixth periods to determine their effectiveness in the electrochemical oxidation of hydrocarbon at relatively low temperatures. Studies were made on hydrocarbon fuel cell electrode structures to determine means of producing greater catalyst-fuel-electrolyte contact and increased current densities. (Author)

14. MATERIALS (NON-METALLIC)

AD-297 025 Div. 14, 4, 1
(TISTM/EJH) OTS price $1.60

Tracor, Inc., Austin, Tex.
DEVELOPMENT OF A TRANSPARENT PRESERVATIVE COMPOUND FOR AIRCRAFT STRUCTURAL METALS.
Quarterly rept. no. 2, 17 Aug-16 Nov 62,
by Robert R. Annand and Jimmie S. Payne, Jr.
14 Dec 62, 8p. incl. illus. table.
(Contract NOw 62-0549-c)
Unclassified report

DESCRIPTORS: *Aircraft finishes, *Polymers, *Plastic coatings, *Organic compounds, Films, Optical materials, Airplane panels, Light transmission, Materials, Molecular structure, Solubility, Chemical reactions, Organic solvents, Nitrogen compounds, Synthesis (Chemistry), Coatings.

The major effort in this quarter was expended on reactions of amines with formaldehyde. Four classes of products were produced: (1) white, insoluble, infusible polymers from reaction of piperazine and formaldehyde; (2) rubbery, somewhat hydrocarbon soluble polymers from hexamethylenediamine and formaldehyde; (3) low molecular

weight polymers from cyclohexylamine and formaldehyde; and (4) a low molecular weight polymer from N,N'-diisopropylhexamethylenediamine and formaldehyde which exhibited very good hydrocarbon solubility. This polymer could be cast into a film but the film proved to be unstable when allowed to stand overnight in air. The amine reactant was synthesized in this laboratory and chosen because it is expected to overcome the crosslinking problem encountered with hexamethylenediamine. It is concluded that the N-C-N structure is indeed associated with good aliphatic hydrocarbon solubility. However, what is needed is the right combination of molecular weight (as high as possible with perhaps a little crosslinking) and solubility. (Author)

AD-297 058 Div. 14
(TISTM/AM) OTS price $2.60

Honeywell Research Center, Hopkins, Minn.
DISLOCATIONS AND THE TENSILE STRENGTH OF POLYCRYSTALLINE MAGNESIUM OXIDE,
by R. J. Stokes and C. H. Li. Jan 63, 21p. incl. illus. tables, 16 refs. (Technical rept. no. 18; Rept. no. HR-63-252)
(Contract Nonr-245600, Proj. NR-032-451)
Unclassified report

DESCRIPTORS: *Magnesium compounds, *Crystal lattice defects, *Powder metallurgy, Tensile properties, Heat treatment, Density, Microstructure, Crystal structure, Surface properties, Fracture (Mechanics), Mechanical properties, Oxides, Sintering.

The tensile strength of polycrystalline magnesia can be high (approximately 30,000 psi) providing there are no fresh or mobile dislocations present. These dislocations may originate in one of two ways. In the first, they may be introduced directly by mechanical contact with the surface. In the second, they may be generated indirectly through the stress concentrations associated with pores. To attain tensile strengths higher than 10-15,000 psi it is necessary to use fully dense pore free material whose surface has been chemically polished or otherwise protected from mechanical contact. (Author)

AD-297 130 Div. 14
(TISTM/AM) OTS price $5.60

General Electric Co., Schenectady, N. Y.
DEVELOPMENT OF INORGANIC BINDERS.
Final rept., 27 June 58-30 Sep 60,
by Henry T. Plant. 27 Oct 60, 52p. incl. illus. tables.
(Contract NOa(s) 58-850-c)
Unclassified report

DESCRIPTORS: *Binders, *Reinforcing materials, *Fibers (Synthetic), *Inorganic compounds, Laminates, Encapsulation, Adhesives, Films, Organic coatings, Lubricants, Experimental data, Electrical properties, Mechanical properties, Heat resistant glass, Heat resistant materials, Ceramic fibers, Glass textiles, Filament wound construction, Silicates, Phosphates.

The development and investigation of phosphate binder composition for use with reinforced laminated glass fibers at limited elevated temperature applications. The experimental data include some mechanical and electrical properties.

AD-297 237 Div. 14
(TISTM/BRW) OTS price $2.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
THE PYROLYSIS OF PLASTICS IN A HIGH VACUUM ARC IMAGE FURNACE. II,
by Henry L. Friedman. Dec 62, 16p. incl. illus. tables, 5 refs. (Rept. no. R62SD57)
(Contracts AF 04(647)269 and AF 04(647)617)
Unclassified report

DESCRIPTORS: *Plastics, Decomposition, Phenolic plastics, Gases, Ablation, Vacuum furnaces, Reinforcing materials, Glass textiles, Nylon, Pyrolysis.

Samples of glass and nylon reinforced CTL 91-LD Phenolic and G. E. 124 Resin were pyrolyzed in an arc image furnace at high vacuum. Compositions of the various degradation gases are reported. Average molecular weights of these gases were calculated. A description of the mechanism of pyrolysis of G. E. 124 Resins is presented. A critique of the method is included. (Author)

AD-297 240 Div. 14, 1
(TISTM/ODN) OTS price $1.10

Aeronautical Engine Lab., Naval Air Material Center, Philadelphia, Pa.
QUALIFICATION TESTS OF INTERNATIONAL LUBRICANT CORPORATION GRADE 1100 ILC CODE 14206 AND ILC CODE 14207 AIRCRAFT ENGINE LUBRICATING OILS.
Final rept.,
by C. J. Collick. 27 Feb 63, 6p. incl. tables.
(Rept. no. NAEC-AEL-1726)
(WEPTASK P. A. NAM-RAPP-41012.3)
Unclassified report

DESCRIPTORS: *Airplane engine oils, *Lubricants, Specifications, Viscosity, Tables, Fluid dynamic properties, Tests.

AD-297 314 Div. 14, 17
(TISTM/BRW) OTS price $1.60

General Dynamics/Convair, San Diego, Calif.
ABRASION WEAR PREVENTIVE DEVICES IN VIBRATING FAYING SURFACES - EVALUATION OF.
Report on Material - Finishes and Coatings - Wear Resistant Abrasion Resistance,
by L. A. Mappus, J. C. George and E. E. Keller. 21 July 59, 16p. illus. tables (Report no. 8926-094)
(Contract AF 33(657)8926)
Unclassified report

DESCRIPTORS: *Aluminum alloys, Abrasives, Finishes and finishing, Friction, Polymers, Halocarbon plastics, Dacron, Nylon, Laminates, Glass textiles, Epoxy plastics, Phenolic plastics, Coatings.

Twenty materials consisting of various fabrics and tapes (polyester, teflon, nylon, dacron), fiberglass laminate (epoxy, polyester, phenolic), epoxy enamel hard anodized coatings, lubricant films, and Type 301 Half Hard stainless steel were applied to 2024-T3 and 7075-T6 aluminum alloy materials and wear tested in various combinations in a sliding abrasion test machine. Dacron tape (Connecticut Hard Rubber Co., New Haven, Connecticut, Temp - R - Tape) sandwiched between sliding 2024-T3 aluminum alloy surfaces displayed the best wear preventative characteristics of all the materials tested at 14 oscillation per second under 2.5 psi pressure. (Author)

AD-297 316 Div. 14
(TISTM/BRW) OTS price $2.60

General Dynamics/Convair, San Diego, Calif.
CERAMIC MATRIX-CERAMIC FIBER COMPOSITE SYSTEMS.
Report on Material - Ceramics - Ceramic Fiber - Ceramic Matrix Systems,
by J. E. Shoffner, E. E. Keller, and W. M. Sutherland. 27 Oct 59, 27p. illus. tables, 37 refs. (Rept. no. 8926-101)
(Contract AF 33(657)8926)
Unclassified report

DESCRIPTORS: *Composite materials, Ceramic fibers, Refractory materials, Ceramic materials.

AD-297 317 Div. 14, 25
(TISTM/ODN) OTS price $1.60

General Dynamics/Convair, San Diego, Calif.
LIGHT TRANSMITTANCE AND ABRASION RESISTANCE OF VARIOUS ALUMINIZED FABRICS.
Report on Material - Fabrics - Aluminized Light Transmittance and Abrasion Resistance,
by H. Mark, J. C. George, and E. E. Keller. 22 Sep 59, 15p. illus. 1 table (Rept. no. 8926-107)
(Contract AF 33(657)8926)
Unclassified report

DESCRIPTORS: *Textiles, *Light transmission, Abrasives, Aluminum coatings, Tests, Test equipment, Seals (Stoppers), Experimental data, Rubber coatings.

The abrasion resistance of aluminized rubber coated fabric CHR and SRGA-0213 fabric was compared by Taber Abraser tests (1000 gram load, CS-17 wheel). The CHR was superior to the SRGA-0213 fabric and it withstood three times as many wear cycles to obtain about 1.3% light transmittance in the 350 to 2000 micron wavelength range. The transmittance of various seam sealants used to cover needle holes in SRGA-0213 was zero. Seam sealing tapes LA #1 and LA #7, and CHR Alt. No. 2 displayed the following respective peel strengths: 2.51 2.06 and 5.16 pounds per inch width. (Author)

AD-297 319 Div. 14, 17
(TISTM/BRW) OTS price $3.60

General Dynamics/Convair, San Diego, Calif.
DEVELOPMENT AND EVALUATION OF HIGH TEMPERATURE CERAMIC ADHESIVES.
Report on Material - Adhesives - Ceramic - High Temperature Development and Evaluation Study,
by D. S. Pratt, J. E. Shoffner and H. C. Turner. 29 Mar 60, 30p. illus. tables, 1 ref. (Report no. 8926-109)
(Contract AF 33(657)-8926)
Unclassified report

DESCRIPTORS: *Ceramic materials, *Stainless steel, High temperature research, Honeycomb cores, Sandwich construction, Glass, Metals, Bonded joints, Powder metals, Refractory materials, Adhesives, Bonding.

Investigation to develop and evaluate ceramic adhesives for bonding metallic alloys - particularly Armco 17-7 PH stainless steel - at firing temperature of 1450 F or less was conducted. Eleven ceramic adhesive frits were formulated for the application, and examined for melting, flow and strength characteristics. Lap shear strengths of 700 psi at room temperature and 900 to 3200 psi at 800 F were developed in the adhesives studied. (Author)

AD-297 321 Div. 14
(TISTM/ODN) OTS price $1.10

General Dynamics/Convair, San Diego, Calif.
SKYDROL 500 HYDRAULIC FLUID RESISTANCE OF EC 1290 SCOTCHWELD PRIME & AF 10 ADHESIVE BONDED JOINTS.
Report on Materials - Adhesives - Structural - EC 1290 and AF-10 (Minnesota Mining and Manufacturing Co.). Skydrol 500 Hydraulic Fluid Resistance,
by A. F. Hooper, J. C. George, and E. E. Keller. 18 Dec 58, 4p. tables, 1 ref. (Rept. no. 8926-089)
(Contract AF 33(657)8926)
Unclassified report

DESCRIPTORS: *Adhesives, *Bonded joints, Compatibility, Hydraulic fluids, Tensile properties, Bonding, Shear stresses, Tests, Mechanical properties, Adhesion, Materials, Aluminum alloys.

Six 2024-T3 aluminum alloy panels, pre-treated with Alodine 600 surface treatment, were spray coated with EC 1290 Scotchweld primer, pre-cured at 150 F for 1/2 hour, cured at 320 F for one hour and immersed in Skydrol 500 hydraulic fluid. Slight softening of the EC 1290 occurred after twelve days immersion at ambient temperature. Additional softening was not observed during eighteen additional days of immersion. Tensile shear and peel test specimens prepared in accordance with Specification Mil-P-5090B and using the EC 1290 primer and AF-10 adhesives were immersed in Skydrol 500 hydraulic fluid for thirty days at ambient temperature. At the end of thirty days immersion tension shear and peel strength tests were made. These tests showed that the Skydrol 500 hydraulic fluid had no significant deleterious effect upon the adhesive bonded joints. (Author)

AD-297 322 Div. 14
(TISTM/ODN) OTS price $2.60

General Dynamics/Convair, San Diego, Calif.
HIGH TEMPERATURE CERAMIC ADHESIVES.
Report on Material - Adhesives - High Temperature Ceramic Literature Survey and Tensile Strengths,
by D. S. Pratt, J. E. Shoffner and E. E. Keller. 2 Mar 59, 19p. illus. tables, 110 refs. (Report no. 8926-091)
(Contract AF 33(657)8926)
Unclassified report

DESCRIPTORS: *Adhesives, *Ceramic materials, *Reviews, Tensile properties, Bibliographies, Adhesion, Metals, High-temperature research.

A literature survey pertinent to high-temperature ceramic adhesives was conducted. Seven literature references are given in the body of the report. Appendix I of the report gives 101 references taken from the technical literature and Appendix II cites 9 references taken from WADC TR 58-184, August 1958. Tensile tests were made with University of Illinois U-1067 composition with indifferent results. (Author)

AD-297 323 Div. 14
(TISTM/ODN) OTS price $1.60

General Dynamics/Convair, San Diego, Calif.
STRUCTURAL ADHESIVES FM 47 PEEL STRENGTH.
Report on Material - Adhesives - Structural - FM-47 (Bloomingdale Rubber Co.). Tensile and Peel Strength Relations,
by H. H. Hunt, G. L. Picotte, and E. E. Keller. 20 Jan 59, 12p. illus. tables (Rept. no. 8926-092)
(Contract AF 33(657)8926)
Unclassified report

DESCRIPTORS: *Adhesives, *Bonded joints, Failure (Mechanics), Reinforcing materials, Glass textiles, Aging (Materials), Bonding, Mechanical properties, Plastics, Tensile properties, Films, High-temperature research, Low-temperature research, Materials, Aluminum alloys.

Tension (Mil-Std-401A) specimens and T-peel specimens, which applied force normal to bond lines at a constant linear rate of failure in the bond between two bonded aluminum alloy strips, were prepared with fiberglass cloth reinforced (supported) and non-reinforced FM-47 structural adhesives. Generally, all adhesives used were pre-cured at 220 F for one hour prior to bonding at 320 F for one hour under a pressure of 100 psi. Various combinations of testing temperature, adhesive weights and bond line thicknesses were tested to arrive at an empirical expression which related the metal peel strength of FM-47 bonds to the mechanical properties of the resin and facings. (Author)

AD-297 324 Div. 14
(TISTM/ODN) OTS price $1.10

General Dynamics/Convair, San Diego, Calif.
PLASTISOL COATED PARTS.
Report on Material - Finishes and Coatings - Plastisol - For Fabricated Parts Storage (Western Coating Co., Westoflex Plastisol). Hardness, Blocking, Peel Strength, Heat Resistance,
by H. Mark, J. C. George and E. E. Keller. 30 Jan 59, 3p. table, 1 ref. (Report no. 8926-093)
(Contract AF 33(657)8926)
Unclassified report

DESCRIPTORS: *Plastic coatings, *Structural parts, Storage, Hardness, Heat-resistant materials, Tests, Mechanical properties.

Duplicate SAE-1020 finish machined parts 8-96176-133, -141, -171 details were plastisol coated with Westoflex Plastisol compound. After coating, the hardness, blocking, peel strength and heat resistance of the coatings were tested in accordance with Specification Mil-P-3999. The hardness of the applied coatings ranged from 65 to 75 Shore Durometer 'A' hardness. Very slight blocking was observed along with a 12 to 18 pounds per inch peel strength. No hardness increase resulted from the heat resistance tests. (Author)

AD-297 326 Div. 14
(TISTM/ODN) OTS price $1.10

General Dynamics/Convair, San Diego, Calif.
QUALIFICATION TEST OF LAMINATES OF FIBERGLASS CLOTH NO. 181 VOLAN, A, WITH POLYESTER 190-2 RESIN. MIL-P-8013c, TYPE I.
Report on Materials - Laminates - Fiberglass - Polyester Resin (No. 190-2, Fiberesin Plastics Co.). Qualification Tests (Mil-P-8013C, Type I),
by G. E. Gardner, Jr., P. W. Bergstedt, and H. C. Turner. 1 Apr 59, 4p. tables (Rept. no. 8926-096)
(Contract AF 33(657)8926)
Unclassified report

DESCRIPTORS: *Polymers, *Glass textiles, *Plastics, Manufacturing methods, Mechanical properties, Tensile properties, Hardness, Elasticity, Compressive properties, Tests, Impregnation, Laminates.

Fiberglass-polyester resin laminates consisting of twelve plies of No. 181 Volan A fiberglass fabric impregnated with No. 190-2 polyester resin were fabricated by vacuum bag curing under 26 inches of mercury at 275 F for 1 hour. Results of several tests are presented under wet conditions and at room temperature. (Author)

AD-297 327 Div. 14
(TISTM/ODN) OTS price $1.10

General Dynamics/Convair, San Diego, Calif.
QUALIFICATION TEST OF LAMINATES OF FIBERGLASS CLOTH NO. 181 VOLAN A, WITH U. S. POLYMERIC CFR 474-MA RESIN, MIL-P-8013C, TYPE I.
Report on Materials - Laminates - Fiberglass - Polyester Resin (CFR 474-MA, U. S. Polymetric Chemicals Co.). Qualification Tests (Mil-P-8013C, Type I),
by G. E. Gardner, Jr., P. W. Bergstedt and H. C. Turner. 7 May 59, 4p. tables (Report no. 8926-097)
(Contract AF 33(657)8926)
Unclassified report

DESCRIPTORS: *Laminates, *Polymers, *Plastics, Impregnation, Hardness, Elasticity, Tensile properties, Mechanical properties, Tests, Aging (Materials), Glass textiles, Materials.

Fiberglass-polyester resin laminates consisting of twelve plies of No. 181 Volan A fiberglass fabric impregnated with CFR 474-MA polyester resin were fabricated by vacuum bag curing under 24 inches of mercury at 275 F for 1 hour. The results of several tests made with this material at room temperature and under wet conditions are presented. (Author)

AD-297 329 Div. 14, 8
(TISTM/ODN) OTS price $1.60

General Dynamics/Convair, San Diego, Calif.
ANTI-STATIC COATINGS FOR MODEL 22 DORSAL ANTENNA.
Report on Materials - Finishes and Coatings - Anti-Static - For Radio Antennas. Surface Resistivity and Application Characteristics,
by L. A. Mappus, J. C. George and E. E. Keller. 15 July 59, 12p. illus. tables. (Report no. 8926-098)
(Contract AF 33(697)8926)
Unclassified report

DESCRIPTORS: *Synthetic rubber, *Antennas, *Plastic coatings, Resistance (Electrical), Epoxy plastics, Films, Materials, Glass textiles, Aging (Materials), Coatings, Rubber coatings, Surface properties.

Gaco N-15 black neoprene coating applied over Bostick 1007 primer, Gaco N-81 black neoprene electron conductive coating over Gaco N-18 primer and topcoated with Gaco N-82 white ionically conductive neoprene coating and Cat-A-Lac 453-1-1 black epoxy anti-static coating were tested to determine their surface resistivity and application characteristics. The Gaco N-51 coating had an infinite surface resistivity. Gaco N-81 had a surface resistivity between 10 to 100 megohm per square. Gaco N-81 topcoated with Gaco N-82 had infinite surface resistance. Cat-A-Lac black epoxy resin material required baking at 250 F and its surface resistivity varied inversely with film thickness. (Author)

AD-297 332 Div. 14
(TISTM/AM) OTS price $1.10

General Dynamics/Convair, San Diego, Calif.
REFLECTANCE CHARACTERISTICS OF REFLECTIVE TAPES.

Division 14 - MATERIALS (NON-METALLIC)

Report on Materials - Finishes and Coatings - Aluminum Foil, Flame Sprayed Aluminum and Flame Sprayed Tin Reflecting Surfaces. Reflectance Characteristics,
by J. Trias, F. M. Graber, and E. E. Keller.
1 Feb 60, 1p. illus. (Rept. no. 8926-105)
(Contract AF 33(657)8926)
Unclassified report

DESCRIPTORS: *Metal coatings, Aluminum coatings, Tin coatings, Glass textiles, Laminates, Foils, Emissivity.

The total and diffuse spectra, in the 300 to 2500 milimicron wavelength range, of commercial aluminum foil (Reynolds wrap), flame sprayed aluminum (commercially pure), and flame sprayed tin (commercially pure) applied to fiberglass laminate either by cementing or flame spraying was determined with a Beckman DK-2 spectroreflectometer. The spectroreflectometer readings are given. (Author)
AD-297 358 Div. 14, 16, 2
(TISTM/EJH) OTS price $1.10

Aerospace Information Div., Washington, D. C.
BACTERIAL SPECIES HARMFUL TO PETROLEUM PRODUCTS IN STORAGE.
21 Feb 63, 4p. 7 refs. (AID rept. no. S-63-26)
Unclassified report

DESCRIPTORS: *Petroleum, *Bacteria, *Biochemistry, Oxidation, Reduction (Chemistry), Sulfates, Sulfides, Sulfur, Hydrogen compounds, Corrosion, Storage, Petrology.

A brief report on Soviet investigations of bacterial species that may possibly be damaging agents of petroleum products in storage is presented. It is based on literature dealing with detection and identification of (1) hydrocarbon-oxidizing bacteria, (2) sulfate-reducing bacteria, and (3) sulfide-oxidizing bacteria. (Author)
AD-297 418 Div. 14
(TISTM/BRW) OTS price $10.10

New Jersey Ceramic Research Station, Rutgers U., New Brunswick.
DEVELOPMENT OF REFRACTORY CERAMICS THAT CAN BE PROCESSED AT TEMPERATURES CONSIDERABLY LOWER THAN THEIR MAXIMUM USE TEMPERATURE.
Quarterly progress rept. no. 3, 1 Oct 62-1 Jan 63,
by Edward J. Smoke and John H. Koenig. 1 Jan 63,
121p. incl. illus. tables, 23 refs.
(Contract NOw 62-0710-d)
Unclassified report

DESCRIPTORS: *Ceramic materials, *Refractory materials, Aluminum compounds, Magnesium compounds, Oxides, High temperature research, Low pressure research, Sintering, Heat treatment, Density, Silicon compounds, Dioxides, Processing.
AD-297 494 Div. 14, 4
(TISTM/EJH) OTS price $5.60

Borden Co., Philadelphia, Pa.
REINFORCED HIGH TEMPERATURE ELASTOMERS.
Quarterly progress rept. no. 1, 16 Sep-31 Dec 62,
by K. C. Tsou, S. J. Makower and others.
31 Dec 62, 28p.
(Contract DA 36-034-AMC-3791(W))
Unclassified report

DESCRIPTORS: *Synthetic rubber, *Elastomers, *Additives, *Organic compounds, Polymers, Silanes, Silicone plastics, Silicon compounds, Mechanical properties, Tensile properties Hardness, High temperature research, Molecular structure, Oxides, Hydroxides, Reinforcing materials, Synthetic rubber, Synthesis (Chemistry).

AD-297 495 Div. 14, 9, 26, 30
(TISTM/AMS) OTS price $2.00

Shell Development Co., Emeryville, Calif.
FUNDAMENTALS OF HIGH TEMPERATURE BEARING LUBRICATION.
Final rept., Dec 61-Nov 62,
by J. B. Accinelli and S. J. Beaubien. Nov 62,
29p. illus. (Rept. no. S-13873)
(Contract NOw 62-0239-c)
Unclassified report

Original contains color plates; all ASTIA reproductions will be in black and white. Original may be seen in ASTIA Hq.

DESCRIPTORS: *Lubrication, *Ball bearings, *Design, Lubricants, Laboratory equipment, Vapors, High temperature research, Velocity, Viscosity, Fluid flow, Torque, Friction, Vaporization, High pressure research, Mineral oils, Failure (Mechanics), Loading (Mechanics), Temperature control, Low pressure research, Temperature, Decomposition.

AD-297 726 Div. 14, 4, 31
(TISTM/RGR) OTS price $13.50

DeBell and Richardson, Inc., Hazardville, Conn.
MATERIALS STUDY - HIGH STRENGTH HIGH MODULUS FILAMENT WOUND DEEP SUBMERGENCE STRUCTURES.
Final rept.
15 Feb 63, 1v.
(Contract NObs-84672)
Unclassified report

DESCRIPTORS: *Hulls (Marine), *Glass textiles, *Plastic coatings, *Laminates, Silanes, Composite materials, Adhesives, Bonding, Vapor plating, Mechanical properties, Binders, Compressive properties, Shear stresses, Surface properties, Fibers (Synthetic), Plastics, Epoxy plastics, Finishes and finishing, Filament wound construction.

AD-297 821 Div. 14, 25
(TISTM/BRW) OTS price $1.60

Stanford Research Inst., Menlo Park, Calif.
BETA-SILICON CARBIDE AND ITS POTENTIAL FOR DEVICES.
Quarterly technical rept. no. 4, 1 Nov 62-31 Jan 63,
by W. E. Nelson. 15 Feb 63, 9p. (Rept. no. 12)
(Contract NObsr-87235, Proj. PMU-3978)
Unclassified report

DESCRIPTORS: *Semiconductor devices, *Silicon compounds, *Single crystals, Electrical properties, Resistance (Electrical), Crucibles, Graphite, Materials, Carbides, Crystal growth.

AD-297 869 Div. 14, 17
(TISTM/BRW) OTS price $2.60

Horizons, Inc., Cleveland, Ohio.
REINFORCEMENT OF NICKEL CHROMIUM ALLOYS WITH SAPPHIRE WHISKERS.
Interim rept. no. 1, 28 Sep-28 Dec 62,
by Robert H. Kelsey. 19 Feb 63, 25p.
(Contract NOw 63-0138-c)
Unclassified report

DESCRIPTORS: *Composite materials, *Nickel alloys, *Chromium alloys, *Sapphires, Ceramic fibers, Aluminum compounds, Oxides, Bonding, Adhesion, Stainless steel, Metallic textiles, Iron, Oxygen, Solubility, Preparation, Reinforcing materials, Single crystals.

AD-297 939 Div. 14
(TISTM/BRW) OTS price $6.60

Mississippi State U., State College.
NONDESTRUCTIVE ANALYSIS OF THE BRITTLE FRACTURE BEHAVIOR OF CERAMIC MATERIALS.
Final rept., 1 Sep 61-31 Aug 62,
by Gary G. Paulson, Julian H. Lauchner and others. Nov 62, 57p.
(Contract AF 33(616)7347, Proj. 7360)
(ASD TR 61-436, pt. 2) Unclassified report

DESCRIPTORS: *Ceramic materials, *Nondestructive testing, Impurities, Elasticity, Resonance, Vibration, Dielectric properties, Stresses, Mechanical properties, Diffusion, X-ray diffraction analysis, Thermal stresses, Thermal diffusion, Mathematical analysis, Fracture (Mechanics), Brittleness.

AD-297 946 Div. 14
(TISTM/BRW) OTS price $2.25

General Electric Co., Cincinnati, Ohio.
CARBONIZATION OF PLASTICS AND REFRACTORY MATERIALS RESEARCH.
Final rept. for 1 July 60-30 June 61 on Material Thermal Properties,
by J. A. Coffman, G. M. Kibler and others.
Jan 63, 183p.
(Contract AF 33(616)6841, Proj. 4776)
(WADD TR 60-646, pt. 2) Unclassified report

DESCRIPTORS: *Plastics, *Refractory materials, *Aromatic compounds, Emissivity, Carbon, Epoxy plastics, Phenolic plastics, Tungsten compounds, Hafnium compounds, Titanium compounds, Carbides, Zirconium compounds, Molybdenum, Graphite, Measurement, Zirconium, Tantalum, Absorption spectrum, Spectroscopy, Pyrolysis, Vapor pressure, Polymers.

AD-297 969 Div. 14
(TISTM/AM) OTS price $2.60

General Electric Co., Cincinnati, Ohio.
HIGH STRENGTH GLASS FIBERS DEVELOPMENT PROGRAM.
Bi-monthly progress rept. no. 4.
20 Jan 63, 20p. illus. table.
(Contract NOw61-0641-c)
Unclassified report

DESCRIPTORS: *Glass textiles, Cryogenics, Corrosion, Composite materials, Epoxy plastics, Ceramic fibers, Tensile properties.

AD-297 989 Div. 14, 30
(TISTM/EJH) OTS price $1.60

Aviation Medical Acceleration Lab., Naval Air Development Center, Johnsville, Pa.
FLAME CONTACT STUDIES. I. APPARATUS AND METHODS FOR DETERMINATION OF HEAT TRANSFER THROUGH FABRIC DURING FLAME CONTACT,
by Alice M. Stoll and Lambert R. Munroe.
26 Dec 62, 15p. (Rept. no. NADC-MA-6215)
Unclassified report

DESCRIPTORS: *Textiles, *Thermal insulation, *Fire-resistant textiles, *Heat resistant materials, Heat transfer, Test equipment, Test methods, Flames, Combustion, Air, Fire protective clothing, Skin, Tests.

AD-298 021 Div. 14
(TISTM/ODN) OTS price $1.10

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
ULTRATHIN GLASS SHEETING,
by Ye. Loktionov. Feb 63, 5p. (Technical memo. no. 1092)
Unclassified report

Translated by U. S. Joint Publication Research Service from Ekonomicheskaya Gazeta, No. 16(688), 18 June 1960, p. 4.

DESCRIPTORS: *Glass, Sheets, Reinforcing materials, Plastics, Films.

AD-298 061 Div. 14, 17, 25
(TISTM/BRW) OTS price $6.00

Southern Research Inst., Birmingham, Ala.
THE THERMAL PROPERTIES OF TWENTY-SIX SOLID MATERIALS TO 5000 DEGREES F OR THEIR DESTRUCTION TEMPERATURES.
Final rept., 1 May 60-31 Apr 62 on Materials Application,
by C. D. Pears, Sabert Oglesby and others.
Jan 63, 420p.
(Contract AF 33(616)7319, Proj. 7381)
(ASD TDR 62-765) Unclassified report

DESCRIPTORS: *Refractory materials, *Heat-resistant metals & alloys, Borides, Carbides, Nitrides, Oxides, Graphite, Tungsten, Molybdenum alloys, Niobium alloys, Thermal expansion, Thermal conductivity, Thermoelectricity, Emissivity, Electrical properties, Density, Microstructure, Mechanical properties.

AD-298 104 Div. 14
(TISTM/AM) OTS price $1.60

Polytechnic Inst. of Brooklyn, N. Y.
IMPROVEMENT OF THERMAL STABILITY OF TEXTILE FIBERS.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 61,
by F. R. Eirich, P. G. Assarsson, and W. M. Lee.
31 Dec 61, 16p.
(Contract N140-138-72225B)
Unclassified report

DESCRIPTORS: *Fire-resistant textiles, *Phosphorous compounds, *Nylon, *Organic compounds, Fibers (Synthetic), Mechanical properties, Preparation, Organic coatings, Heat-resistant materials, Heat-resistant plastics, Chemical bonds, Phosphorylation, Coatings.

AD-298 105 Div. 14
(TISTM/AM) OTS price $1.10

Polytechnic Inst. of Brooklyn, N. Y.
IMPROVEMENT OF THERMAL STABILITY OF TEXTILE FIBERS.
Quarterly progress rept. no. 3, 1 Jan-31 Mar 62.
31 Mar 62, 6p.
(Contract N140(138)72225B)
Unclassified report

DESCRIPTORS: *Fire resistant textiles, *Nylon, *Phosphorous compounds, *Organic compounds, Fibers (Synthetic), Heat resistant plastics, Heat resistant materials, Preparation, Organic coatings, Phosphorylation, Chemical bonds, Coatings.

AD-298 013 Div. 14, 30
(TISTM/EJH) OTS price $1.60

Aviation Medical Acceleration Lab., Naval Air Development Center, Johnsville, Pa.
FLAME CONTACT STUDIES. III. DETERMINATION OF

THERMAL PROPERTIES OF MATERIALS IN THIN LAYERS,
by Alice M. Stoll. 26 Dec 62, 12p. (Rept. no. NADC-MA-6217)
(Subtask MR005.13-1005.1; Wep Task RAE20J-010/2021/F012-10-002)
Unclassified report

DESCRIPTORS: *Textiles, *Heat-resistant materials, *Fire-resistant textiles, *Thermal insulation, Thermal diffusion, Test methods, Flames, Combustion, Theory, Skin, Fire-protective clothing, Thermal conductivity, Tests.

15. MATHEMATICS

AD-297 001 Div. 15, 13
(TISTB/LMH) OTS price $3.60

Naval Civil Engineering Lab., Port Hueneme, Calif.
STUDY OF QUEUING THEORY IN SHELTER ENTRANCEWAY DESIGN,
by D. B. Ryder. 18 Jan 63, 39p. incl. illus. tables, 3 refs. (Rept. no. TN-472)
(Proj. Y-F011-05-401(d))
Unclassified report

DESCRIPTORS: *Shelters, *Queuing theory, Personnel, Simulation, Management engineering, Probability, Design.

Experimental data is presented which tests the assumptions on which application of queuing theory to the design and location of personnel shelters, is based. A method outlining the development of design criteria of general usefulness is also given. (Author)

AD-297 091 Div. 15, 30
(TISTP/BM) OTS price $1.10

Boeing Scientific Research Labs., Seattle, Wash.
A FAST PROCEDURE FOR GENERATING EXPONENTIAL RANDOM VARIABLES,
by M. D. MacLaren, G. Marsaglia, and T. A. Bray. Jan 63, 9p. incl. illus. tables, 3 refs. (Mathematical note no. 283; D1-82-0228)
Unclassified report

Also available from the author.

DESCRIPTORS: *Statistical functions, *Computers, *Programming (Computers), Probability, Digital computers.

A very fast method for generating exponential random variables in a digital computer is presented. The method is exact, in the sense that in theory it returns a random variable with exactly the exponential distribution. In practice the result is an approximation, but the accuracy of the approximation depends only on the word length of the computer. (Author)

AD-297 217 Div. 15
(TISTP/JW) OTS price $6.60

Brown U., Div. of AppliedMathematics, Providence, R. I.
A CENTRAL LIMIT THEOREM FOR NON-LINEAR FUNCTIONS OF A NORMAL STATIONARY PROCESS,
by Tze-Chien Sun. Jan 63, 62p. incl. il. 7 refs. (Technical rept. no. 8)
(Contract Nonr-56229, Proj. NR-042-217)
Unclassified report

DESCRIPTORS: *Nonlinear systems, Functions, Distribution theory, Equations of state, Matrix algebra, Theory.

AD-297 220 Div. 15
(TISTP/WH) OTS price $4.60

Institute of Mathematical Sciences, New York U., N. Y.
THE DISCRIMINANT OF HILL'S EQUATION.
Doctoral thesis,
by David L. Jagerman. Nov 62, 43p. 8 refs.
(Research rept. no. BR-39)
(Contract AF 49(638)229, Proj. 47500)
Unclassified report

DESCRIPTORS: *Differential equations, *Discriminants, *Series, Functions, Fourier analysis, Integral transforms, Integral equations.

Structure theorems for the discriminant, $\Delta(\omega^2)$, of Hill's differential equation are developed by means of interpolatory function theory (cardinal series representations). A method of solution of Hill's equation is developed yielding an asymptotic expansion of the discriminant for large $|\omega|$ with error term $O(|\omega|^{-9})$. Asymptotic expansions for the eigenvalues λ_n, λ_n for large n are obtained with error terms $O(n^{-7})$. Relations between the occurrence of double zeros of the discriminant and the period of the coefficient function in Hill's differential equation are established. A discriminant-like function $D(\omega^2)$ is introduced and an interpolatory function-theoretic structure result is obtained. (Author)

AD-297 251 Div. 15, 7, 8
(TISTP/MB) OTS price $5.60

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
OPTIMIZATION OF MULTIVARIABLE SAMPLED-DATA CONTROL SYSTEMS,
by Jean Lieutaud. Sep 62, 50p. incl. illus. 6 refs. (Research rept. no. PIBMRI-1078-62)
(Grant AF-AFOSR-62-295)
Unclassified report

DESCRIPTORS: *Control systems, *Statistical analysis, Matrix algebra, Sampling.

This study is concerned with the optimization of multivariable sampled-data control systems. A squared error performance criterion is chosen and the effects of controllability and observability are studied. In particular it is shown that the optimization can always be carried out on a system all of whose coordinates are both controllable and observable. In each case several illustrative examples are included. (Author)

AD-297 369 Div. 15, 32
(TISTB/AW) OTS price $3.60

Princeton U., N. J.
THE POWER OF A COALITION,
by Michael Maschler. 7 Jan 63, 29p. 12 refs.
(Research memo. no. 50)
(Contract Nonr-185816)
Unclassified report

DESCRIPTORS: *Game theory, Social sciences.

This paper is intended to meet the criticism which questions the possibility of applying n-person Game Theory to real-life situations. The fact that such a criticism is mainly directed to non-constant-sum games suggests that it is not the various solution theories which are at fault, but rather that one ought to look for some further information about the nature

of the game and its players if one wants to arrive at some more convincing applications. This paper suggests that a search for the standard of fairness of the players may provide the required information. (Author)

AD-297 391 Div. 15, 30
(TISTP/TL) OTS price $7.60

Naval Research Lab., Washington, D. C.
A DIGITAL COMPUTER PROGRAM FOR CALCULATING SPHEROIDAL WAVE FUNCTION EIGENVALUES AND EXPANSION CONSTANTS,
by S. Hanish and R. V. Baier. 31 Jan 63, 69p. incl. tables (NRL rept. no. 5837)
Unclassified report

DESCRIPTORS: *Digital computers, *Differential equations, Bessel functions, Series, Special functions (Mathematical), Programming (Computers).

Using the well-known procedures of Bouwkamp (Theoretische en numerieke behandling van de buiging door een ronde opening, Diss. Groningen, Groningen Batavia, 1941) for finding the eigenvalues of differential equations solvable by application of three-term recursion formulas, the authors have developed a digital computer program in symbolic language for obtaining the eigenvalues of the separated steady-state wave equation in spheroidal coordinates, i.e., for the equation

$$\frac{d}{d\eta}\left[(1-\eta^2)\frac{dS_{m\ell}}{d\eta}\right] + \left[A_{m\ell} - h^2\eta^2 - \frac{m^2}{1-\eta^2}\right] S_{m\ell} = 0$$

where the parameters ℓ, m, and h are as defined by Stratton et al. in Spheroidal Wave Functions (New York:Wiley, 1956). The symbolic language used is universal (e.g., add a to b, multiply c by d, etc.) and may be applied to any digital computer by simple conversion to machine language. The program developed requires at least 3400 working cells. It computes the eigenvalue $A_{m\ell}$ to a maximum of 13 significant places for any integer values of ℓ and ($\ell \geq m$). The value of h is left arbitrary. The program also computes all the spheroidal wave function expansion coefficients (d_p) up to $p \leq 200$. (Author)

AD-297 441 Div. 15, 30
(TISTP/TL) OTS price $1.60

System Development Corp., Santa Monica, Calif.
USE OF LINEARIZED NONLINEAR REGRESSION FOR SIMULATIONS INVOLVING MONTE CARLO,
by John E. Walsh. 3 May 62, 14p. 3 refs. (Rept. no. SP-487)
Unclassified report

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DESCRIPTORS: *Curve fittings, *Simulation, *Monte Carlo methods, Models (Simulation), (Computers), Programming (Computers), Probability.

A computer run for each situation involving Monte Carlo is often expensive and time consuming, but that simulation outcomes are usually desired for a very large number of situations. Presents a linearized nonlinear regression method which has substantial curve-fitting flexibility, is satisfactorily determined from a number of simulation runs, and is computationally manageable. Outlines some nonprobabilistic curve-fitting procedures for determining a regression function. Concludes that the use of the linearized nonlinear regression method has desirable features for optimizations. (Author)

AD-297 444 Div. 15, 18
(TISTW/JEA) OTS price $4.60

System Development Corp., Santa Monica, Calif.
A GENERAL SIMULATION MODEL FOR LOGISTICS OPERATION IN A RANDOMLY-DAMAGED SYSTEM,
by John E. Walsh. 10 Jan 60, 39p. (Rept. no. SP-116)
Unclassified report

DESCRIPTORS: *Logistics, *Probability, *Monte Carlo method, Statistical functions, Statistical distributions, Simulation, Statistical processes, Functions, Procurement, Transportation, Theory, Damage, Operations, Distribution (Economics).

A simulation model for logistics operation in a system in which natural attrition and induced attrition occur is described. The capability of the logistics operation is examined by simulating the operation of the entire system for a specified time period. To obtain the simulation model, the overall system is divided into subsystems and attrition is introduced by a Monte Carlo procedure. Repetitions of this simulation furnish an indication of the effects of statistical variation. It was concluded that the mathematical model furnished by the relationships of the various quantities that occur in the simulation model presented, and their order of presentation, seems to be sufficiently general for use in the investigation of many types of logistics situations. (Author)

AD-297 456 Div. 15
(TISTP/JW) OTS price $4.60

System Development Corp., Santa Monica, Calif.
IMPORTANCE SAMPLING IN MONTE CARLO ANALYSIS,
by Charles E. Clark. 24 June 60, 41p. incl. tables, 5 refs. (Technical memo. no. TM-505)
Unclassified report

DESCRIPTORS: *Sampling, *Numerical analysis, Statistical analysis, Monte Carlo method, Effectiveness.

Importance sampling is described as used in Monte Carlo analyses. An intuitive justification of the procedure is developed through a non-mathematical consideration of the fundamental random processes involved. The sampling procedure and its efficiency are illustrated by numerical examples. (Author)

AD-297 476 Div. 15
(TISTP/JW) OTS price $8.10

Air Force Special Weapons Center, Kirtland Air Force Base, N. M.
CONSIDERATIONS OF ROOT SENSITIVITY IN THE TIME DOMAIN.
Doctorial thesis,
by Richard Marvin Joppa. Jan 63, 80p. (Rept. no. AFSWC TDR 62-123)
Unclassified report

DESCRIPTORS: *Linear systems, Design, Time-lag theory, Functions, Polynomials.

AD-297 522 Div. 15, 28
(TISTP/TL) OTS price $1.60

California U., Los Angeles.
AN EXPERIMENTAL STUDY OF A STOCHASTIC MODEL OF

THERMAL PROPERTIES OF MATERIALS IN THIN LAYERS,
by Alice M. Stoll. 26 Dec 62, 12p. (Rept. no. NADC-MA-6217)
(Subtask MR005.13-1005.1; Wep Task RAE20J-010/2021/F012-10-002)
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System Development Corp., Santa Monica, Calif.
IMPORTANCE SAMPLING IN MONTE CARLO ANALYSIS,
by Charles E. Clark. 24 June 60, 41p. incl. tables, 5 refs. (Technical memo. no. TM-505)
Unclassified report

DESCRIPTORS: *Sampling, *Numerical analysis, Statistical analysis, Monte Carlo method, Effectiveness.

Importance sampling is described as used in Monte Carlo analyses. An intuitive justification of the procedure is developed through a non-mathematical consideration of the fundamental random processes involved. The sampling procedure and its efficiency are illustrated by numerical examples. (Author)

AD-297 476 Div. 15
(TISTP/JW) OTS price $8.10

Air Force Special Weapons Center, Kirtland Air Force Base, N. M.
CONSIDERATIONS OF ROOT SENSITIVITY IN THE TIME DOMAIN.
Doctorial thesis,
by Richard Marvin Joppa. Jan 63, 80p. (Rept. no. AFSWC TDR 62-123)
Unclassified report

DESCRIPTORS: *Linear systems, Design, Time-lag theory, Functions, Polynomials.

AD-297 522 Div. 15, 28
(TISTP/TL) OTS price $1.60

California U., Los Angeles.
AN EXPERIMENTAL STUDY OF A STOCHASTIC MODEL OF

CHOICE BEHAVIOR,
by Gordon Becker, Morris DeGroot, and Jacob Marschak. Jan 63, 13p. (Working paper no. 28)
Unclassified report

DESCRIPTORS: *Probability, *Statistical tests, *Statistical distribution, *Group dynamics, Statistical analysis, Groups (Mathematics), Behavior, Reaction (Psychology).

AD-297 536 Div. 15
(TISTP/JW) OTS price $3.60

Institute of Science and Tech., U. of Michigan, Ann Arbor.
GENERALIZED FREQUENCY-RESPONSE CONCEPTS FOR TIME-VARYING, DISCRETE-TIME LINEAR SYSTEMS,
by A. W. Naylor. Feb 63, 30p. (Rept. no. 4563-32-T)
(Contracts AF 33(616)8365 and DA 36-039-sc-89227)
Unclassified report

DESCRIPTORS: *Mathematical analysis, Transformations (Mathematics), Frequency analyzers, Linear systems.

AD-297 572 Div. 15
(TISTP/TL) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
ON THE SUPERPOSITION OF ORDINARY STEADY FLOWS WITH A LIMITED AFTEREFFECT,
by N. P. Buslenko. 23 Jan 63, 6p. 1 ref. (Trans. no. FTD-TT-62-1383 from Akademiya Nauk SSSR. Laboratoriya Sistem Peredachi Informatsii. Problemy Peredachi Informatsii, No. 9, pp. 79-82, 1961)
Unclassified report

DESCRIPTORS: *Algebraic topology, Statistical distribution, Statistical functions, Theory, Statistical test.

Formulas associated with the superposition of ordinary steady flows with a limited aftereffect are derived. (Author)

AD-297 858 Div. 15
(TISTP/JW) OTS price $1.60

Aerospace Corp., Los Angeles, Calif.
COMPUTATION OF THE REPEATED INTEGRALS OF THE ERROR FUNCTION COMPLEMENT,
by W. R. Wilcox. 2 Jan 63, 15p. (Rept. no. TDR-169(3240-10)TR-2)
(Contract AF 04(695)169)
(SSD TDR 63-3) Unclassified report

DESCRIPTORS: *Numerical analysis, Reliability, Functions, Errors.

AD-297 954 Div. 15
(TISTP/MB) OTS price $2.60

RAND Corp., Santa Monica, Calif.
INVARIANT IMBEDDING AND THE INTEGRATION OF HAMILTON'S EQUATIONS,
by Richard Bellman and Robert Kalaba. Feb 63, 18p. (Memo. no. RM-3538-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Transport properties, Neutron transport theory, Neutrons, Dynamics, Particles, Partial differential equations, Theory.

AD-298 020 Div. 15
(TISTE/OHD) OTS price $1.10

Washington U., Seattle.
INTEGRAL INVARIANTS AND STABILITY,
by Harold H. Johnson. 14 Dec 62, 4p. (Technical rept. no. 16)
(Contract Nonr-47715, Proj. NR 043 186)
Unclassified report

DESCRIPTORS: *Differential equations, Linear systems, Stability.

AD-298 048 Div. 15
(TISTE/OHD) OTS price $2.60

New York U., Coll. of Engineering, N. Y.
THE APPLICATION OF CERTAIN RULER CONSTRUCTIONS TO THE POINCARE AND CAYLEY-KLEIN MODELS OF HYPERBOLIC GEOMETRY.
Scientific rept. no. 6,
by L. J. Kaplan and D. J. R. Stock. 7 July 62, 22p. (Technical rept. no. 400-62)
(Contract AF 19(604)7486, Proj. 5635)
(AFCRL 62-940) Unclassified report

DESCRIPTORS: *Geometry, Microwave networks, Special functions (Mathematical).

AD-298 121 Div. 15
(TISTB/LMH) OTS price $7.60

Purdue U., Lafayette, Ind.
DISCRETE OPTIMIZING,
by Stanley Reiter and Gordon R. Sherman. Feb 63, 77p. (Institute paper no. 37)
(Contract Nonr-1116)
Unclassified report

DESCRIPTORS: *Probability, Economics, Management engineering, Commerce, Industrial relations, Polynomials, Decision making.

16. MEDICAL SCIENCES

AD-297 069 Div. 16
(TISTB/LMH) OTS price $3.60

Institute for Research in Vision, Ohio State U. Research Foundation, Columbus.
THE VISIBILITY OF NON-UNIFORM TARGET-BACKGROUND COMPLEXES. II. FURTHER EXPERIMENTS,
by Gordon A. Bixel and H. Richard Blackwell. July 61, 19p. illus. 6 refs. (Technical rept. no. 890-2)
(Contract AF 30(602)1974, Proj. 8501)
(RADC TDR 63-60) Unclassified report

DESCRIPTORS: *Vision, *Targets, Eye, Illumination, Light, Measurement, Optical images, Thresholds (Physiology), Target discrimination, Visibility.

Studies have been made of targets of uniform luminance presented against backgrounds of non-uniform luminance and consisting of an array of ball-bearings painted gray, which produced a regular pattern of luminance non-uniformity, each element of which subtended 8 minutes of arc. Targets were circles measuring 4, 8, and 24 minutes in diameter which were superimposed over the background, thus obscuring it over their area. Experiments were conducted in which the overall contrast of the target-background complex was systematically varied until the target

was at the visibility threshold. When the visibility of the targets was considered described by their luminance with respect to the average luminance of the background, the visibility thresholds of targets presented against non-uniform backgrounds differed from those of targets presented against uniform backgrounds in a complex manner which differed as a function of target size. However, when the visibility of the targets was considered described by their luminance with respect to the luminance of the immediately adjacent elements of the background, visibility thresholds were the same for targets presented against uniform and non-uniform backgrounds. This implies that visibility thresholds are determined by target contrast at target borders rather than by some kind of average contrast. Similar results were obtained at exposure durations of 1.9 and 0.1 seconds. (Author)

AD-297 084 Div. 16
(TISTB/AW) OTS price $1.60

Air Force Special Weapons Center, Kirtland Air Force Base, N. Mex.
CLASSIFICATION OF CIRCULATING LEUKOCYTES IN THE NORMAL MEXICAN BURRO,
by Ronald E. Engel, Sadie Cartwright, and F. A. Spurrell. Jan 63, 9p. 29 refs. (Rept. no. AFSWC TDR 62-95)
(Proj. 7801)
Unclassified report

DESCRIPTORS: *Leukocytes, Equines, Lymphocytes, Radiation injuries, Hematology, Classification.

The morphology of circulating leukocytes of the normal burro is reported. The granulocytic and agranulocytic series are described and compared in part to those of the horse. Lymphocytes are divided into small, medium, large transitional, and plasma cellular types. Occasional cell types found in blood smears from the normal burro are described. (Author)

AD-297 141 Div. 16
(TISTB/AW) OTS price $1.10

Liege U. (Belgium).
GENETIC DETERMINANTS OF COLICIN PRODUCTION, PRINCIPALLY THEIR RELATION WITH BACTERIOPHAGES AND WITH THE F AGENT OF FERTILITY.
Annual technical rept. no. 2, 1 Dec 61-30 Nov 62, by Pierre Fredericq. 30 Nov 62, 9p. incl. tables.
(Contract DA 91-591-EUC-2042)
Unclassified report

DESCRIPTORS: *Bacteria, Chromosomes, Xylose, Escherichia, Streptomycins, Selection, Bacteriophages, Mutations, Genetics.

Linkage of the V and B colicinogenic factors from wild strain K260 with an F agent was studied. The linkage is preserved after one and even 2 passages in the K12 strain. Some of the recombinants which received the B colicinogenic factor alone are highly fertile. They are probably of the same type. The B colicinogenic factor can be transfered from Hfr K12 to E.coli B, though the recombination rates are much lower than when both parents are K12. The colicinogenic factor is transfered in close association with the str markers but the fertility of recombinants is not easy to determine. Among the colicinogenic recombinants some are definitely Hfr, others are F+ and some appear to be F-. The 2 strains K94 and K260, previously studied in crosses with K12, were used as male parents in crosses with E.coli B. Results with K94 are similar to those obtained previously, except that many colicinogenic recombinants appear to be F-. In the cross with K260, the results are very different according to the selection used. Most recombinants selected for transfer of try are rather stable heterozygotes carrying a duplication of the try region, to which is linked the F agent and the colicinogenic factors V and B. They are highly fertile and probably of the F+ type. (Author)

AD-297 348 Div. 16
(TISTB/LMH) OTS price $.75

Boston U. School of Medicine, Mass.
STUDIES AT MODERATE HYPOTHERMIC TEMPERATURES OF FACTORS AFFECTING SURVIVAL UNDER PROLONGED HYPOTHERMIA.
Report on Biophysics in Flight,
by Evangelos T. Angelakos. Nov 62, 20p. incl. tables, 8 refs.
(Contract AF 33(616)6767, Proj. 7222)
(AMRL TDR 62-130) Unclassified report

DESCRIPTORS: *Hypothermia, Exposure, Heart, Physiology, Survival, Laboratory animals.

AD-297 372 Div. 16
(TISTB/AW) OTS price $1.10

Pennsylvania U., Philadelphia.
CELLULAR ACTIONS OF NEUROHUMORAL TRANSMITTORS.
Final rept., 15 Jan 60-31 May 62,
by George B. Koelle and Niels Haugaard.
7 Feb 63, 5p.
(Contract DA 18-108-405-cml-630)
Unclassified report

DESCRIPTORS: *Autonomic nervous system, *Phosphorylation, *Biochemistry, Heart, Rats, Adenosine phosphates, Drugs, Glucose, Oxidation, Cholinesterase, Electron microscopy, Reserpine.

AD-297 412 Div. 16
(TISTB/AW) OTS price $1.60

Naval Radiological Defense Lab., San Francisco, Calif.
EFFECTS OF DIVIDED DOSES OF X RAY ON MORTALITY AND HEMATOLOGY OF SMALL AND LARGE DOMESTIC ANIMALS,
by G. F. Leong, W. G. Wisecup, and J. W. Grisham. 7 Jan 63, 22p. incl. illus. tables, 17 refs.
(Rept. no. NRDL-TR-606)
Unclassified report

DESCRIPTORS: *Radiological dosage, *X rays, Hematology, Laboratory animals, Convalescence, Measurement.

An attempt to establish a correlation of systemic recovery with hematological recovery after X-radiation exposure for the mouse, rabbit, sheep and goat under uniform experimental conditions is presented as part of a continuing program to provide a valid estimate of the rate of recovery in man after radiation exposure by these correlative factors for various species. By separating these animals into two broad groups, small and large animals, significant differences have been demonstrated as to their LD 50/30, hematological recovery and systemic recovery. Furthermore, a significant departure from the generally accepted exponential recovery after a radiation insult has been shown for both small and large animals. The need for a more critical analysis of recovery at intervals well past the recovery half-time is indicated in evaluating rates of recovery. (Author)

Division 16 - MEDICAL SCIENCES

AD-297 427 Div. 16
(TISTB/AW) OTS price $1.60

Physiological Research Lab., Springfield Coll., Mass.
THE EFFECT OF ADHESIVE STRAPPING ON ANKLE ACTION,
by Richard B. McCorkle, Charles M. Tipton, and Peter V. Karpovich. 27 Feb 63. 10p. incl. illus. tables, 6 refs.
(Contract DA 49-007-md-889)
Unclassified report

DESCRIPTORS: *Joints (Physiology), Motion, Exercise, Test methods, Safety, Legs, Adhesive tapes.

AD-297 461 Div. 16
(TISTB/AW) OTS price $2.60

School of Aerospace Medicine, Brooks Air Force Base, Tex.
PATHOGENIC MECHANISMS IN GAS AND FAT EMBOLISM,
by James F. Wittmer. Sep 62, 27p. incl. illus. tables, 69 refs. (Review no. 4-62)
Unclassified report

DESCRIPTORS: *Embolism, *Gas embolism, Pathology, Etiology, Decompression sickness, Reviews.

The syndromes produced by gas and fat emboli constitute a problem area in clinical medicine. Often the symptomatology is nonspecific, the diagnosis difficult, the treatment insufficient, the results disastrous. Likewise, such embolism is of considerable interest and importance to the physicians serving aviators, divers, and caisson workers. These individuals are exposed to changes in barometric pressure that often produce symptoms similar to those seen in gas and fat embolism. These syndromes, called dysbarism or decompression sickness, are thought by many to have an etiology involving gas and fat emboli. Much has been written about 'pure' gas embolism, 'pure' fat embolism, and dysbarism; less attention has been given to their similarities. This review was written to discuss and compare these forms of embolism, with emphasis given to the circulatory pathways by which the emboli can be distributed. Knowledge of the general mechanisms in the transport of emboli could lead to a better understanding of the etiology and pathogenesis of all these syndromes; at least, it can provide a firm base for hypotheses to be tested in searching for etiologic mechanisms. (Author)

AD-297 462 Div. 16
(TISTB/AW) OTS price $3.60

School of Aerospace Medicine, Brooks Air Force Base, Tex.
CARDIOPULMONARY RESUSCITATION,
by Richard C. Wolff and Richard J. Ward. Jan 63, 31p. illus. table, 62 refs. (Review no. 10-62)
Unclassified report

DESCRIPTORS: *Artificial respiration, Heart, Pathology, Education.

AD-297 463 Div. 16
(TISTB/AW) OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
THE ISOLATION OF ENTEROVIRUSES FROM THE NORMAL BABOON (PAPIO DOGUERA),
by Rafael A. Fuentes-Marins, Arthur A. Rodrigues and others. Nov 62, 6p. incl. illus. tables, 10 refs. (Rept. no. SAM-TDR 62-124)
(Proj. 7753)
Unclassified report

DESCRIPTORS: *Enteroviruses, Kidneys, Sensitivity, Culture media, Primates.

Two viruses isolated from the normal baboon are described. These two agents have not been found to be related to any known human viruses. One virus was isolated from the African-African group (animals recently captured in minimal contact with man, i.e., less than two weeks) and the other agent was isolated from the African group (animals born in Africa and maintained in captivity at the Southwest Foundation for Research and Education). These two agents are distinct and show no evidence of cross reactions. Their biologic characterization is described. (Author)

AD-297 540 Div. 16
(TISTB/AW) OTS price $1.10

Naval Radiological Defense Lab., San Francisco, Calif.
SODIUM DEPENDENCE OF BIOELECTRIC OUTPUTS IN RAT STOMACH,
by J. T. Cummins and B. E. Vaughan. 14 Jan 63, 10p. incl. illus. table, 9 refs. (NRDL-TR-608)
Unclassified report

DESCRIPTORS: *Biophysics, *Radiation tolerance, Ions, Sodium compounds, Transport properties, Laboratory animals, Electric potential, Stomach.

When sodium in a Krebs-Ringer type media was replaced by choline, the potential difference across rat stomach as measured in vitro was substantially eliminated. Substitutions of sulfate for chloride and of sodium for potassium did not affect the bioelectric measurements. A residual potential of -2mV was detected, which was sensitive to anoxia and dependent neither on sodium nor on chloride. (Author)

AD-297 570 Div. 16
(TISTB/AW) OTS price $3.60

Foreign Tech Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
PHYSIOLOGICAL JOURNAL OF THE USSR (SELECTED ARTICLES).
14 Feb 63, 31p. incl. illus. refs. (Trans. no. FTD-TT-62-1176 from Fiziologicheskiy Zhurnal SSSR, 48:4, pp. 436-443, 455-463, 1962)
Unclassified report

DESCRIPTORS: *Heat production (Biology), *Respiration, *Biochemistry, Muscles, Oxygen consumption, Exposure, Nervous system, Hemoglobin, Transport properties, Periodicals, Temperature control, Carbon dioxide.

AD-297 740 Div. 16, 3
(TISTB/CCH) OTS price $11.50

Army Biological Labs., Fort Detrick, Md.
BIOCHEMISTRY OF THE PLAGUE BACILLUS (PASTEURELLA PESTIS),
by Ye. M. Gubarev and N. N. Ivanovskiy.
28 Dec 62, 151p. (Translation no. 703)
Unclassified report

DESCRIPTORS: *Biochemistry, *Pasteurella, Diseases, Antigens, Metabolism, Carbohydrates, Sulfur, Enzymes, Bacteriophage, Diagnosis, Toxins.

AD-297 767 Div. 16
(TISTB/CCH) OTS price $2.60

School of Aerospace Medicine, Brooks Air Force Base, Tex.
MEASUREMENT OF THE EFFECTS OF EPINEPHRINE, ATROPINE, AND CHLORPROMAZINE ON THE EEG ACTIVATION RESPONSE,
by Eldred T. Richey. Dec 62, 20p. (Review no. 9-62)
Unclassified report

DESCRIPTORS: *Electroencephalography, *Brain, Epinephrine, Atropine, Chlorpromazine, Drugs, Stimulation.

AD-297 863 Div. 16
(TISTB/AW) OTS price $1.10

Loma Linda U., Calif.
PROCUREMENT AND ISOLATION OF BIOLOGICALLY ACTIVE SUBSTANCES DERIVED FROM NATURAL SOURCES.
Final rept., 1 Dec 61-28 Jan 63,
by George J. Nelson. 28 Feb 63, 3p.
(Contract DA 18-108-cml-7031)
Unclassified report

DESCRIPTORS: *Toxins and antitoxins, Separation, Purification, Fishes.

AD-297 873 Div. 16
(TISTB/AW) OTS price $2.60

Seton Hall U., Jersey City, N. J.
STUDIES RELATIVE TO ANTIGENICITY OF PLASMA VOLUME EXPANDERS.
Annual progress rept., Mar 62-Mar 63,
by Paul H. Maurer. Mar 63, 8p. tables.
(Contract DA 49-193-md-2113)
Unclassified report

DESCRIPTORS: *Plasma substitutes, *Antigen-antibody reactions, *Carboxy (COOH), Immunity, Genetics, Peptides, Polymers, Amino acids, Antigens & antibodies, Copolymerization.

AD-297 961 Div. 16
(TISTB/AW) OTS price $1.60

Physiological Research Lab., Springfield Coll., Mass.
MUSCLE EXTENSIBILITY,
by Peter V. Karpovich and Charles M. Tipton.
8 Mar 63, 5p. illus. tables.
(Contract DA 49-007-md-889)
Unclassified report

DESCRIPTORS: *Muscles, Contraction, Test methods, Legs, Relaxation (Physiology), Measurement.

AD-297 965 Div. 16
(TISTB/AW) OTS price $1.60

California U., San Francisco Medical Center.
STUDIES ON THE NATURE OF IMMUNITY AND PARASITE SPECIFICITY IN HELMINTHS AND STUDIES ON THE NATURE OF IMMUNITY AND PARASITE SPECIFICITY IN THE EGYPTIAN AND AFRICAN SUDAN AREAS.
Final rept., 1 Nov 58-31 Oct 62,
by Donald Heyneman. Oct 62, 12p.
(Contract Nonr-23356, Proj. NR 103 446)
Unclassified report

DESCRIPTORS: *Parasites, *Worms, Etiology, Trematodes, Nematodes, Leishmania, Epidemiology, Immunity.

AD-298 023 Div. 16
(TISTB/CCH) OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
FORMALDEHYDE PERFUSION AND METHYLENE BLUE GROSS STAINING TECHNIC IN THE DRY FIXATION OF LUNG TISSUE,
by Petra Romero and Wilhelmina I. Butcher.
Oct 62, 7p. (Technical rept. no. SAM-TDR-62-97)
(Proj. 7758)
Unclassified report

DESCRIPTORS: *Lungs, *Biological stains, Diagnosis, Respiratory system, Histology, Diagnostic agent.

AD-298 035 Div. 16
(TISTB/CCH) OTS price $8.10

Bernice P. Bishop Museum, Honolulu, Hawaii.
PACIFIC ISLAND RAT ECOLOGY: REPORT OF A STUDY MADE ON PONAPE AND ADJACENT ISLANDS 1955-1958,
by Robert L. Strecker, Joe T. Marshall, Jr. and others. 31 Dec 62, 273p. (Bulletin 225)
Unclassified report

DESCRIPTORS: *Rat, *Ecology, Economics, Diseases, Parasites.

AD-298 039 Div. 16, 3
(TISTB/CCH) OTS price $1.60

California U., Los Angeles.
THE COLLECTION AND STUDY OF PLANTS CONTAINING DISABLING AGENTS.
Final rept., 1 June 61-1 June 62,
by Dermot B. Taylor and John A. Bevan. 1 June 62, 1v. (Rept. no. CPI-15190)
(Contract DA 18-108-cml-6613)
Unclassified report

DESCRIPTORS: *Plants, *Non-lethal agents, *Nervous system, Processing, Biochemistry, Brain.

AD-298 091 Div. 16, 28
(TISTB/AW) OTS price $1.60

Biotechnology Lab., U. of Calif., Los Angeles.
PROGRESS REPORT, DECEMBER 15, 1962.
15 Dec 62, 16p. (Rept. no. 62-9)
(Contracts V1005M-2075, N123(60530)23558A, and AF 33(616)6763)
Unclassified report

DESCRIPTORS: *Prosthetics, *Tracking, Joints (Physiology), Servomechanisms, Arms, Muscles, Display systems, Design, Control, Effectiveness.

AD-298 112 Div. 16
(TISTB/AW) OTS price $1.60

Aviation Medical Acceleration Lab., Naval Air Development Center, Johnsville, Pa.
THE EFFECTS OF APPLIED OCULAR PRESSURE AND OF POSITIVE ACCELERATION ON PHOTIC DRIVING IN MAN,
by T. D. Duane, David H. Lewis and others.
28 Dec 62, 9p. (Rept. no. NADC-MA-6214)
Unclassified report

DESCRIPTORS: *Vision, *Acceleration tolerance, *Blackout (Physiology), Electroencephalography, Pressure, Blood pressure, Retina, Blood circulation, Eye, Optic nerve.

17. METALLURGY

AD-297 021 Div. 17, 26
(TISTM/BRW) OTS price $5.60

Universal-Cyclops Steel Corp., Bridgeville, Pa.
INFAB PROCESSING OF TZM SHEET.
Interim technical engineering rept. no. 3, 15 Aug 62-15 Jan 63,
by F. R. Cortes. 15 Jan 63, 45p. incl. illus. tables.
(Contract AF 33(657)8495)
(ASC TR 7-786 (III)) Unclassified report

DESCRIPTORS: *Molybdenum alloys, Titanium alloys, Zirconium alloys, Sheets, Forging, Rolling mills, Controlled atmospheres, Hardness, Microstructure, Crystal structure, High temperature research, Processing.

Seven extruded billets and two of four ingot sections were successfully impact forged to sheet bar and evaluated. Each of the nine sheet bar was cut into four sections and these were rolled to 0.125 in. intermediate gauge at temperatures from 2000 to 3200 F. A total of 29 pieces of intermediate gauge strip were produced and partially evaluated for soundness and evidence of contamination. (Author)

AD-297 038 Div. 17
(TISTM/AM) OTS price $2.50

Sylvania Electric Products, Inc., Towanda, Pa.
DEVELOPMENT AND PRODUCTION OF IMPROVED MOLYBDENUM SHEET BY POWDER METALLURGY TECHNIQUES.
Final rept., 1 Oct 59-30 Sep 62,
by Roger B. Bargainnier, Richard F. Cheney, and Lauri D. Tiala. 31 Jan 63, 84p. incl. illus. tables, 10 refs.
(Contract NOa(s) 60-6018-c)
Unclassified report

DESCRIPTORS: *Molybdenum, *Powder metallurgy, *Molybdenum alloys, Mechanical properties, Recrystallization, Microstructure, Dispersion hardening, Sintering, Titanium alloys, Controlled atmosphere, Sheets, Processing.

A powder-metallurgical molybdenum alloy was developed which, in wrought form, has properties as good, or better than, those of arc-cast Mo-0.5Ti. The alloy, Mo-0.5Ti-0.03C (MTC), was selected after screening 15 molybdenum-alloy systems. Process specifications for 40-mil MTC sheet were developed. In the as-rolled condition the sheet has an ultimate tensile strength at 1200 C of about 60 ksi. It is approximately 50% recrystallized after one hour at 1210 C, and its ductile-brittle transition temperature is below room temperature. MTC seems to be responsive to strain-induced precipitation strengthening in a manner similar to that ascribed by other investigators to certain arc-cast molybdenum alloys. Sintering at >1850 C is necessary to develop the best properties in MTC sheet. (Author)

AD-297 043 Div. 17
(TISTM/BRW) OTS price $2.60

Clevite Corp., Cleveland, Ohio.
FIBER REINFORCEMENT OF METALLIC AND NONMETALLIC COMPOSITES.
Interim technical engineering rept. 17 July-17 Nov 62,
by R. H. Baskey. 27 Dec 62, 28p. incl. tables, 2 refs.
(Contract AF 33(657)7139, Proj. 7-924)
(ASD TR-7-924, vol. 4)
Unclassified report

DESCRIPTORS: *Composite materials, *Reinforcing materials, Cobalt, Tungsten, Metallic textiles, Sheets, Mechanical properties, Tensile properties, Forging, Processing, Wire, Powder metals, High temperature research, Hot working, Metals, Fibers.

The elevated temperature (2000F) short time tensile strength of cobalt was increased from 2,700 psi to 23,700 psi by reinforcing the cobalt with 18 vol. percent of 5 mil continuous tungsten wires. This strengthening by 5 mil wires was equivalent to 89 percent of theoretical strengthening and was comparable to that attained by using the same quantity of 10 mil tungsten wire. Hot pressed cobalt containing a random distribution of discontinuous wires (10 mil, 5 mil or 2 mil cut into 1/8 or 1/4 inch lengths) were hot rolled into 0.050 inch sheet. Crack-free sheets were obtained from compacts containing up to 30 vol. percent of 5 mil wire and up to 20 vol. percent of 10 mil wire. Hot rolled cobalt sheets (0.050 inch) containing 10, 20 or 30 vol. percent of tungsten wire of either 10 mil, 5 mil or 2 mil diameter and lengths of 1/8 or 1/4 inch in a random pattern were weaker than pure cobalt at room temperature. However, at 2000F, the cobalt sheet containing a random pattern of tungsten wire was approximately twice as strong as pure cobalt sheet. (Author)

AD-297 059 Div. 17
(TISTM/AM) OTS price $8.10

ManLabs, Inc., Cambridge, Mass.
MECHANICAL BEHAVIOR OF INTERMETALLIC COMPOUNDS.
Rept. for 15 Oct 61-14 Oct 62 on Refractory Inorganic Non-metallic Materials,
by P. Stark, J. Ryan and S. V. Radcliffe. Jan 63, 82p. incl. illus. tables, 52 refs.
(Contract AF 33(657)7432, Proj. 7350)
(ASD TDR 62-1087, pt. 1)
Unclassified report

DESCRIPTORS: *Intermetallic compounds, *Phase studies, *Crystal lattice defects, Mechanical properties, Microstructure, Crystal lattices, Vanadium alloys, Nickel alloys, Cobalt alloys, Chemical analysis, Extrusion, Deformation (Mechanics), Heat treatment, Castings, Hardness (Mechanical properties), Grain structures (Metallurgy), Processing.

Suitable melting, casting and fabrication techniques were developed for the preparation of the intermetallic compounds VNi_3 and VCo_3 in a form suitable for the study of mechanical behavior. The annealing behavior of arc-melted, rolled and extruded materials were examined by metallographic and hardness techniques. The mechanical behavior of cast and extruded material of various grain size and degrees of order were determined by indentation stress-strain, compression and tensile testing and fractography. Arc-melted ingots of VNi_2, V_2Ni, V_3Ni, VCo and V_3Co were prepared and the feasibility of their homogenization and fabrication examined. An extensive review of the relevant literature was completed. Finally, the validity of a method of computing Young's modulus for intermetallic compounds was investigated. (Author)

AD-297 124 Div. 17
(TISTM/BRW) OTS price $3.75

Defense Metals Information Center, Columbus, Ohio.
REACTIVITY OF METALS WITH LIQUID AND GASEOUS

OXYGEN,
by J. D. Jackson, W. K. Boyd and P. D. Miller.
15 Jan 63, 26p. incl. illus. tables, 22 refs.
(DMIC memo. 163)
(Contract AF 33(616)7747, Proj. 2(8-8975))
Unclassified report

DESCRIPTORS: *Titanium, *Titanium alloys, *Liquefied gases, Coatings, Copper coatings, Nickel, Metal coatings, Oxides, Nitrides, Oxygen, Chemical reactions.

Of all the metals studied, Ti exhibits the greatest sensitivity to impact when immersed in LOX. In fact, its sensitivity approaches that of many organic materials such as greases and oils. Reactivity is observed in liquid oxygen and mixtures of liquid oxygen and liquid nitrogen at 20 ft lb until the LOX concentration is reduced to 30%. Titanium can be partially protected from reactivity in LOX under impact by certain protective coatings, provided the coatings are not broken. Protection is given by electroless copper and nickel, possibly aluminum, and to a lesser extent by Teflon and a fluoride-phosphate coating. Protection is also obtained by nitriding which adds a protective film to the surface, and by annealing which increases the thickness of the oxide film. Titanium exhibits no great reactivity in LOX when deformed by compression, by exposure of a fresh surface by machining or rupture, or by exposure of bulk titanium to high-pressure or high-velocity LOX. In gaseous oxygen, titanium is highly reactive when a freshly formed surface is exposed at even moderate pressure. (Author)

AD-297 178 Div. 17, 26
(TISTM/BRW) OTS price $6.60

Brush Beryllium Co., Cleveland, Ohio.
DEVELOPMENT OF FINE DIAMETER HIGH-PURITY WIRE FROM ZONE-REFINED BERYLLIUM.
Final rept.,
by A. G. Gross, Jr. and R. G. O'Rourke. Dec 62, 54p. incl. illus. tables, 15 refs. (Technical rept. no. 298-236)
(Contract NOw 62-0067-c)
Unclassified report

DESCRIPTORS: *Beryllium, Crystals, Single crystals, Recrystallization, Drawing (Machine processing), Zone melting, Purification, Tensile properties, Heat treatment, Deformation, Microstructure, Wire.

Zone-refined crystals of both thermally and electrolytically reduced beryllium were converted to polycrystalline aggregates by a combination of deformation and heat treatment. The resulting polycrystalline aggregates were subjected to deformation at 450 C by standard beryllium wire-drawing techniques. A limited amount of metallurgical evaluation of the resulting wire was accomplished. It was found that combination of twinning and primary recrystallization was required to convert the single crystal to a truly polycrystalline aggregate. The wire produced from zone-refined beryllium exhibited usable structural tensile-properties at room temperature. (Author)

AD-297 246 Div. 17
(TISTM/BRW) OTS price $3.60

Du Pont Metals Center, E. I., Du Pont de Nemours and Co., Inc., Baltimore, Md.
REFRACTORY ALLOY FOIL ROLLING DEVELOPMENT PROGRAM.
Interim rept. no. 2, 15 Oct 62-15 Jan 63.
15 Jan 63, 30p. incl. illus. tables.
(Contract AF 33(657)8912, Proj. 7-987)
Unclassified report

DESCRIPTORS: *Heat-resistant metals & alloys, *Niobium alloys, *Tantalum alloys, Tungsten alloys, Zirconium alloys, Molybdenum alloys, Vanadium alloys, Hafnium alloys, Powder metallurgy, Melting, Electric arcs, Foils.

The melting of three niobium-base alloy and two tantalum-base alloy ingots by arc-casting is described. The alloys were Cb-10%W-1%Zr-0.1%C (D-43), Cb-5%Mo-5%V-1%Zr (B-66), Cb-10%W-2-1/2%Zr (Cb-752), Ta-10%W, and Ta-8%W-2%Hf (T-111). The process consisted of hydrostatic compaction of elemental powders into electrodes followed by double consumable arc melting to yield 6-inch diameter ingots. Analytical and metallurgical testing of the ingots is described. (Author)

AD-297 264 Div. 17
(TISTM/BRW) OTS price $2.60

United Aircraft Corp., East Hartford, Conn.
ANALYTICAL AND EXPERIMENTAL INVESTIGATIONS OF THE FRACTURE MECHANISMS OF CONTROLLED POLYPHASE ALLOYS.
Quarterly progress rept. no. 1, 29 Oct 62-29 Jan 63.
28 Feb 63, 26p. incl. illus. tables. (Rept. no. B-910068-1)
(Contract N600(19)59361)
Unclassified report

DESCRIPTORS: *Alloys, Copper alloys, Chromium alloys, Aluminum alloys, Nickel alloys, Metallic crystals, Fracture (Mechanics).

The results of preliminary investigations on selected unidirectionally solidified, binary eutectic alloys are reported. These investigations have shown that the Cu-Cr and Al-Al3Ni systems can be successfully unidirectionally solidified with only very occasional growth defects, bands, such that highly oriented microstructures result. Large ingots of the Al-CuAl2 system have not been produced free of bands to date. However, several ingots with only slight or light bands were obtained. The Al-Al3Ni system was chosen as an alternate for the Cr-Cr23C6 system, both rod-type eutectics, since the reinforcing rod or whisker in the latter system was determined to be Cr rather than Cr23C6. (Author)

AD-297 315 Div. 17
(TISTM/BRW) OTS price $1.60

General Dynamics/Convair, San Diego, Calif.
EFFECTS OF SODIUM CHLORIDE ON STRESS CORROSION CRACKING OF TITANIUM ALLOY DURING STRESS RELIEVING.
Report on Materials - Titanium Alloy - Ti2.5Al-5Sn(A110AT). Stress Corrosion Cracking,
by B. Faulkenberry, A. Ianucci and others.
19 May 59, 10p. illus. tables, 1 ref. (Rept. no. 8926-099)
(Contract AF 33(657)8926)
Unclassified report

DESCRIPTORS: *Titanium alloys, Sodium compounds, Chlorides, Stresses, Aluminum alloys, Tin alloys, Heat treatment, Fracture (Mechanics), Corrosion.

Ti2.5Al-5Sn(A110AT) formed parts which were stress relieved at 1150 F for one hour in heat treating fixtures in such a manner that stresses were generated within parts during heat treatment were found to be cracked just after heat treatment. The cause of cracking was, by a process of elimination, attributed to the presence of sodium chloride deposited on the surface of parts rinsing subsequent to acid etching. The use of sodium chloride free rinse water eliminated the stress corrosion cracking. (Author)

AD-297 318 Div. 17
(TISTM/DRW) OTS price $1.10

General Dynamics/Convair, San Diego, Calif.
EFFECT OF VARYING STRETCH TO PRODUCE -T651 CONDITION IN EXTRUDED 7075 ALUMINUM ALLOY BAR STOCK.
Report on Material - Aluminum - 7075-T651 Effect of Stretching on Mechanical Properties,
by P. W. Bergstedt, H. C. Turner, and W. M. Sutherland. 16 Nov 59, 6p. illus. tables.
(Rept. no. 8926-108)
(Contract AF 33(657)8926)
Unclassified report

DESCRIPTORS: *Aluminum alloys, Deformation, Extrusion, Heat treatment, Mechanical properties, Hardening.

Aluminum alloy bars taken from a 1 x 1-1/4-in. cross section 7075-T6 extrusion was solution heat treated at 870 F for 95 min, water-quenched and stretch-straightened. After stretch straightening, separate bars were stretched an additional 0.78, 1.74, 1.94 or 2.65%. This stretching resulted in 5 to 10% losses in tensile and yield strengths when compared with the properties of a bar which was not stretch-straightened. The compression yield strength losses closely paralleled the tensile strength losses. However, stretching to 2.65% appeared to result in recovery from the greatest compression yield strength loss found at 1.94% stretch. Distortion measurements which related the effect of metal removal with resultant distortion indicated that from 78 to 86% of the distortion resulting from the removal of metal from an unstretched bar could be eliminated by stretching. (Author)

AD-297 330 Div. 17
(TISTM/AMS) OTS price $1.10

General Dynamics/Convair, San Diego, Calif.
MECHANICAL PROPERTIES OF HOT-FORMED 5Al - 2.5 Sn TITANIUM ALLOY.
Report on Material - Titanium - Ti 2.5Al 5Sn Mechanical Properties of Hot Formed Sheet,
by P. W. Bergstedt, H. C. Turner, and W. M. Sutherland. 19 Mar 59, 3p. illus. table.
(Rept no. 8926-102)
(Contract AF 33(600)8926)
Unclassified report

DESCRIPTORS: *Titanium alloys, *Stretch forming, Hot working, Tensile properties, Ductility, Deformation, Compressive properties, Mechanical working, Forging, Aluminum alloys, Tin alloys.

Laboratory tests were made to determine the effect of hot forming upon the mechanical properties of Ti-2.5A-5Sn alloy. Ti-2.5Al-5Sn sheet, 0.050 inch thick, was stretch wrapped at various rates and held for various times after wrapping against a stretch forming die which was heated to 1150 F. This treatment resulted in tensile losses of from zero to 3%; ultimate strength losses of from zero to 6%; elongation losses averaging about 2.5% of the original elongation; and compression yield strength losses ranging upwards to 7%. In general, the property losses were very slight. (Author)

AD-297 331 Div. 17
(TISTM/AMS) OTS price $1.60

General Dynamics/Convair, San Diego, Calif.
EFFECT OF TENSILE DEFORMATION AND HEAT TREATMENT UPON THE MECHANICAL PROPERTIES OF 10% COLD WORKED HASTELLOY R-235.
Report on Material - Nickel Base Alloy - Hastelloy R-235, 10 Per Cent Cold Worked. Effect of Stretching and Heat Treatment on Mechanical Properties,
by A. Giuntoli, P. Bergstedt, and H. C. Turner. 3 June 59, 10p. illus. (Rept. no. 8926-103)
(Contract AF 33(657)8926)
Unclassified report

DESCRIPTORS: *Nickel alloys, *Stretch forming, Compressive properties, Deformation, Tensile properties, Ductility, Cold working.

The effect of stretching to 17 and 26% permanent set, followed by heating at 1500 F for various times, upon the longitudinal and transverse room-temperature mechanical properties of 0.062 inch thick 10% cold-worked Hastelloy R-235 nickel base alloy was determined. Generally, increased stretching resulted in increased tensile strengths and decreased compressive yield strengths. As received 10% cold-worked Hastelloy displayed the Bauschinger effect only in the longitudinal direction, but additional stretching to 17% permanent set introduced the effect in the transverse direction. Stretching to 26% permanent set resulted in increases in compression yield strength, but did not eradicate the Bauschinger effect. Only heat treatment (1500 F for 2 hours) served to eradicate the Bauschinger effect from the cold worked material. This heat treatment resulted in slight decreases in the strength of the cold worked materials. (Author)

AD-297 482 Div. 17, 25
(TISTM/BRW) OTS price $2.25

Naval Ordnance Lab., White Oak, Md.
REVIEW OF ALUMINUM-IRON MAGNETIC ALLOYS AND ASSOCIATED SYSTEMS (0 TO 10% ALUMINUM),
by H. H. Helms, Jr. 23 Oct 62, 89p. (Rept. no. NOLTR 62-144)
Unclassified report

DESCRIPTORS: *Magnetic alloys, *Iron alloys, *Aluminum alloys, Electrical properties, Resistance (Electrical), Heat treatment, Density, Deformation, Transformations, Magnetostriction, Radiation damage, Crystal structure, Mechanical properties, Preparation, Magnetic properties.

AD-297 490 Div. 17
(TISTM/BRW) OTS price $2.75

Martin-Marietta Corp., Baltimore, Md.
THE EFFECT OF MICROSTRUCTURE ON THE PROPERTIES OF DISPERSION HARDENED MATERIALS.
Final technical rept.,
by Howard R. Peiffer. Oct 60, 115p.
(Contract NOa(s) 59-6230-c)
Unclassified report

DESCRIPTORS: *Alloys, *Microstructure, Cold-working, Powder metallurgy, Mixtures, Sintering, Extrusion, Aluminum, Particles, Stainless steel, Aluminum compounds, Thorium compounds, Oxides, Silver, Dispersion hardening, Mechanical properties.

AD-297 541 Div. 17
(TISTM/AM) OTS price $1.10

Laboratories for Research and Development, Franklin Inst., Philadelphia, Pa.
THE FLOW AND FRACTURE OF ZONE REFINED TUNGSTEN.
Quarterly progress rept., 1 Oct-31 Dec 62, by John R. Wiese. 31 Dec 62, 7p. incl. illus.
(Rept. no. Q-B1973-2)
(Contract DA 36-034-ORD-3747, Proj. 59332008)
Unclassified report

DESCRIPTORS: *Tungsten, *Zone melting, Single crystals, Purification, Laboratory equipment, Processing, Melting, Electron beams, Induction heating.

A description and pictures of the equipment and apparatus to be used for the induction zone-refining of tungsten is presented. Design and mechanical problems have been overcome and the system is ready for experimental zone-refining passes. (Author)

AD-297 750 Div. 17
(TISTM/BRW) OTS price $.50

Naval Research Lab., Washington, D. C.
CREEP-RUPTURE OF NICKEL OF TWO PURITIES IN CONTROLLED ENVIRONMENTS,
by P. Shahinian and M. R. Achter. 22 Jan 63, 13p. (NRL rept. no. 5880)
Unclassified report

DESCRIPTORS: *Nickel, Impurities, Creep, Rupture, Fracture (Mechanics), Controlled atmospheres, Air, Nitrogen, Helium, Low pressure research, Mechanical properties.

AD-297 803 Div. 17
(TISTM/BRW) OTS price $19.75

Lockheed Aircraft Corp., Marietta, Ga.
DETERMINATION OF DESIGN DATA FOR HEAT TREATED TITANIUM ALLOY SHEET. VOLUME 3. TABLES OF DATA COLLECTED.
Final rept., 31 Mar 59-31 Mar 62 on Materials Application.
Dec 62, 331p.
(Contract AF 33(616)6346, Proj. 7381)
(ASD TDR 62-335, vol. 3) Unclassified report

DESCRIPTORS: *Titanium alloys, Sheets, Vanadium alloys, Chromium alloys, Aluminum alloys, Molybdenum alloys, Tensile properties, Compressive properties, Shear stresses, Creep, Rupture, Welds, Low temperature research, High temperature research, Tables, Data, Design, Mechanical properties.

AD-297 836 Div. 17, 25
(TISTM/BRW) OTS price $.75

Naval Radiological Defense Lab., San Francisco, Calif.
THERMAL DIFFUSIVITY MEASUREMENTS ON METALS AND CERAMICS AT HIGH TEMPERATURES.
Final rept., 1 Jan 61-1 Jan 62 on Chemistry and Physics of Materials,
by R. L. Rudkin, W. J. Parker, and R. J. Jenkins.
Jan 63, 20p.
(Contract MIPR 33(616)61-7, Proj. 7360)
(ASD TDR 62-24) Unclassified report

DESCRIPTORS: *Ceramic materials, *Metals, High temperature research, Measurement, Iron, Molybdenum, Titanium, Aluminum compounds, Zirconium compounds, Photographic analysis, Oxides, Thermal diffusion.

AD-297 854 Div. 17
(TISTM/BRW) OTS price $1.10

Metals Processing Lab., Mass. Inst. of Tech., Cambridge.
INVESTIGATION OF THE ACTIVATED SINTERING OF TUNGSTEN POWDER.
Bimonthly progress rept. no. 4, 1 May-30 June 62.
23 July 62, 4p.
(Contract NOw 61-0326-d)
Unclassified report

DESCRIPTORS: *Powder metallurgy, *Tungsten, Nickel, Cobalt, Palladium, Platinum, Rhodium, Ruthenium, Additives, Sintering.

AD-297 855 Div. 17
(TISTM/BRW) OTS price $1.10

Metals Processing Lab., Mass. Inst. of Tech., Cambridge.
INVESTIGATION OF THE ACTIVATED SINTERING OF TUNGSTEN POWDER.
Bimonthly progress rept. no. 5, 1 July-31 Aug 62.
17 Sep 62, 2p.
(Contract NOw 61-0326-d)
Unclassified report

DESCRIPTORS: *Powder metallurgy, *Tungsten, Copper, Cobalt, Nickel, Palladium, Platinum, Rhodium, Ruthenium, Additives, Sintering.

AD-297 856 Div. 17
(TISTM/BRW) OTS price $1.10

Metals Processing Lab., Mass. Inst. of Tech., Cambridge.
INVESTIGATION OF THE ACTIVATED-SINTERING OF TUNGSTEN POWDER.
Bimonthly progress rept. nos. 1, 2 and 3, 1 Nov 61-30 Apr 62.
18 May 62, 5p.
(Contract NOw 61-0326-d)
Unclassified report

DESCRIPTORS: *Powder metallurgy, *Tungsten, Nickel, Cobalt, Palladium, Rhodium, Ruthenium, Platinum, Additives, Sintering.

AD-297 865 Div. 17, 8
(TISTM/AM) OTS price $1.00

Naval Radiological Defense Lab., San Francisco, Calif.
TOTAL NORMAL AND TOTAL HEMISPHERICAL EMITTANCE OF POLISHED METALS - PART II.
Rept. on Chemistry and Physics of Materials,
by G. L. Abbott, N. J. Alvares, and W. J. Parker.
Jan 63, 31p.
(Contract MIPR 33(616)61-7, Proj. 7360)
(WADD TR 61-94, pt. 2) Unclassified report

DESCRIPTORS: *Molybdenum, *Resistance (Electrical), *Emissivity, *Platinum, Radiation measurement systems components, Design, Data, High temperature research, Microstructure.

AD-297 959 Div. 17
(TISTM/AM) OTS price $3.60

Brussels U. (Belgium).
VAPORIZATION OF COMPOUNDS AND ALLOYS AT HIGH

TEMPERATURE. PART I. MASS SPECTROMETRIC DETERMINATION OF THE DISSOCIATION ENERGIES OF THE MOLECULES AgAu, AgCu, AND AuCu.
Rept. for Mar 59-Mar 60 on Refractory Inorganic Nonmetallic Materials,
by Marcel Ackerman, Fred E. Stafford, and J. Drowart. Nov 60, 26p.
(Contract AF 61(052)225, Proj. 7350)
(WADD TR 60-782, pt. 1)
Unclassified report

DESCRIPTORS: *Mass spectroscopy, *Group I elements, *Dissociation, Gold alloys, Silver alloys, Copper alloys, Experimental data, Heat of sublimation, High temperature research, Vaporization, Vapors, Alloys, Energy.

AD-297 998 Div. 17
(TISTM/AM) OTS price $3.00

Lockheed Aircraft Corp., Marietta, Ga.
DETERMINATION OF DESIGN DATA FOR HEAT TREATED TITANIUM ALLOY SHEET. VOLUME I. SUMMARY OF MECHANICAL AND PHYSICAL PROPERTY DATA COLLECTED, INCLUDING TENSILE CREEP AND FATIGUE.
Final rept., 31 Mar 59-31 Mar 62 on Materials Application,
by P. J. Hughes. Dec 62, 176p.
(Contract AF 33(616)6346, Proj. 7381)
(ASD TDR 62-335, vol. 1) Unclassified report

DESCRIPTORS: *Titanium alloys, Aging, Dispersion hardening, Aluminum alloys, Chromium alloys, Molybdenum alloys, Vanadium alloys, Tensile properties, Creep, Fatigue (Mechanics), Sheets, Mechanical properties.

AD-298 092 Div. 17
(TISTM/BRW) OTS price $1.10

Armour Research Foundation, Chicago, Ill.
ZONE REFINING OF CEMENTED TUNGSTEN-BASE ALLOYS. TASK 1.
Quarterly rept., 1 Apr-30 June 62 on Development and Application of a Theory for Plastic Deformation of Cemented Alloys,
by N. M. Parikh. 25 July 62, 5p.
(Contract DA 11-022-505-ORD-3092, Proj. TB4-002)
(WAL TR 372/32-5, T1) Unclassified report

DESCRIPTORS: *Tungsten alloys, *Tungsten, Nickel alloys, Sheets, Processing, Powder metallurgy, Hydrostatic pressure, Rolling mills, Zone melting, Sintering.

AD-298 111 Div. 17, 25
(TISTM/BRW) OTS price $2.60

Manufacturing Labs., Inc., Cambridge, Mass.
THE THERMODYNAMIC PROPERTIES OF ALPHA, F.C.C., NICKEL-ZINC ALLOYS,
by Edward V. Clougherty and Larry Kaufman.
1 Feb 63, 28p. (Tech. rept. no. 6)
(Contract Nonr-260000)
Unclassified report

DESCRIPTORS: *Nickel alloys, *Zinc alloys, Vapor pressure, Measurement, Entropy, Specific heat, Powder metals, Thermodynamics.

AD-298 117 Div. 17, 31
(TISTM/BRW) OTS price $1.00

Naval Research Lab., Washington, D. C.
FACTORS THAT DETERMINE THE APPLICABILITY OF HIGH STRENGTH QUENCHED AND TEMPERED STEELS TO SUBMARINE HULL CONSTRUCTION,
by W. S. Pellini and P. P. Puzak. 5 Dec 62, 32p.
(NRL Rept. no. 5892)
Unclassified report

DESCRIPTORS: *Submarine hulls, *Steel, Heat treatment, Fracture (Mechanics), Design, Stresses, Materials, Welds.

AD-298 140 Div. 17
(TISTM/AM) OTS price $1.60

Pressure Technology Corp. of America, Woodbridge, N. J.
A STUDY TO DETERMINE THE DEFORMATION CHARACTERISTICS OF BERYLLIUM AND TUNGSTEN UNDER CONDITIONS OF HIGH HYDROSTATIC PRESSURE.
Interim rept. no. 1, 14 Nov 62-14 Jan 63.
Feb 63, 13p. incl. illus.
(Contract N600(19)59430)
Unclassified report

DESCRIPTORS: *Tungsten, *Beryllium, *Deformation, Compressive properties, Tensile properties, Extrusion, Hydrostatic pressure, Ductility, High-pressure research.

Tungsten and beryllium have been subjected to preliminary tensile tests, compressive tests, and extrusion in a high hydrostatic pressure environment to determine the relationship of ductility as a function of the hydrostatic pressure.

18. MILITARY SCIENCES AND OPERATIONS

AD-297 430 Div. 18, 30
(TISTW/JEA) OTS price $3.60

Lockheed Electronics Co., Plainfield, N. J.
RADAR AIR TRAFFIC CONTROL CENTER DISPLAY SYSTEM.
Interim development rept., 20 June-20 Sep 59,
by R. Kavlick. 22 Sep 59, 15p. incl. illus.
(Contract NObsr-77632, Proj. NE 010200)
Unclassified report

DESCRIPTORS: *Air traffic control centers, *Plan position indicators, *Circuits, Radar equipment, *Display systems, Radar scanning, Radar signals, Television converters, Television display systems, Radar landing control, Radar targets, Test methods, Design, Tests.

The scan conversion device to be used in the Intec type TMA403X which possesses the resolution and storage capabilities required to meet the equipment specification. Design of the scan 'write' and 'read' sweep circuitry has progressed to the sweep deflection amplifiers. Electrical specifications for the scan converter deflection yoke were finalized and design of the yoke drivers will be initiated. A Reeves type R601H wide band resolver will be used to derive the resolved radar sweeps. Design of the resolver driver was completed. A theoretical analysis of the light-producing capability of the Schmidt projector system utilizing the 5AZP4 has shown that a 30-foot lambert image high-light brightness can be obtained. An analysis of the X-ray radiation problem associated with the 5AZP4 and means of providing adequate protection against the danger of X-ray radiations was also made. A study of the advantages of a vertical display versus a horizontal display indicated that a vertical PPI display offers a number of significant advantages to a horizontal display of equal size. (Author)

AD-297 559 Div. 18, 20, 29
(TISTW/PCR) OTS price $1.60

Naval Civil Engineering Lab., Port Hueneme, Calif.
SETTLING AND FILTERING EQUIPMENT FOR ROOF-WASH-DOWN RADIOLOGICAL COUNTERMEASURES.
Final rept.,
by E. N. Hellberg. 8 Feb 63, 24p. incl. illus. table (Technical rept. no. R-219)
(Proj. Y-F011-05-201)
Unclassified report

DESCRIPTORS: *Radioactive fallout, *Decontamination, Industrial equipment, Countermeasures, Tests, Test methods, Pumps, Tanks (Containers), Chemical precipitation, Tables, Photographs, Pictures, Roofs, Liquid filters.

Tests were made to determine if radioactive fallout particles can be removed from roof-washdown water by settling and filtering, thus permitting continuous use of the water by recirculation. A settling tank, a filtering tank, a circulating pump, a flocculent injector, and other allied mechanical equipment were used in the tests. The fallout simulant was sand of various particle sizes tagged with a radioactive tracer. Since a roof section was not used in the tests, the simulant was fed directly into a sloping, open channel which returned the wash water from the filtering tank to the settling tank. It was concluded that settling and filtering tanks connected in series permit satisfactory separation of the simulant from the wash water. It was further concluded that a recirculating-water roof-washdown system using settling and filtering tanks is feasible. (Author)

AD-297 901 Div. 18
(TISTB/AW) OTS price $9.10

System Development Corp., Santa Monica, Calif.
AN ANALYSIS OF 58,000 OPERATOR ACTIONS IN A SAGE COMBAT SETTING,
by H. Sackman. 19 Feb 63, 101p. (Technical memo. no. TM-873/000/01)
(Contract AF 19(628)1648)
Unclassified report

DESCRIPTORS: *Data processing systems, *Air defense command, Operators (Personnel), Stress (Psychology), Simulation, Warfare.

19. NAVIGATION

AD-297 070 Div. 19
(TISTW/RD) OTS price $8.10

North American Aviation, Inc., Los Angeles, Calif.
PHASE I OF INVESTIGATION OF THE EFFECTS OF ENVIRONMENT OF THE REDESIGN OF AN/TSQ-47.
7 Feb 63, 76p. incl. illus. tables, 22 refs.
(Contract AF 19(628)1635)
(ESD TDR 62-350) Unclassified report

DESCRIPTORS: *Air traffic control systems, Airports, Landing fields, Runways, Permafrost, Deserts, Climatology.

A study is presented of environmental effects on redesign of the AN/TSQ-47, Air Traffic Control/Communications System. The areas of expected deployment of the AN/TSQ-47 were derived from historical conflict data; airbases throughout the world at which the system may operate were compiled, and climatic data for selected locations were chosen to represent conditions which may be encountered by the system. This report presents a summarization of data on more than 10,000 bases with a cursory analysis of probable deployment. (Author)

AD-297 155 Div. 19
(TISTW/RD) OTS price $5.60

Motorola, Inc., Phoenix, Ariz.
NAVIGATION RECEIVER FOR USE IN RADUX LF NAVIGATION SYSTEM.
Final engineering rept., 10 July 56-1 July 59. 1 July 59, 54p. incl. illus. table, 10 refs.
(Contract NObsr-72578)
Unclassified report

DESCRIPTORS: *Radio receivers, *Hyperbolic navigation, Phase shifters, Radiofrequency filters, Discriminators, Design, Radio navigation, Low frequency.

The design, development, and fabrication of receivers for the Radux LF navigation equipment for service test evaluation are discussed. Part I contains both a restatement of the purpose of the project and a detailed tabulation of the technical personnel effort expended. Especially considered are the design and development work accomplished on the receiver unit, phase comparator unit, power supply unit, remote monitor unit, remote indicator unit, recorder unit, sequential correlator, and electromechanical data. (Author)

AD-297 808 Div. 19
(TISTA/FRL) OTS price $8.60

National Aviation Facilities Experimental Center, Atlantic City, N. J.
A SIMULATION STUDY OF IFR HELICOPTER OPERATIONS IN THE NEW YORK AREA.
Final rept.,
by A. L. Sluka, J. R. Bradley and others.
June 62, 93p.
(Proj. 115-608-3X)
Unclassified report

Original contains color plates; all ASTAI reproductions will be in black and white. Original may be seen in ASTIA Hq.

DESCRIPTORS: *Air traffic control systems, *Helicopters, Tests, Simulation, Navigational aids, Flight paths, Configuration, Instrument flight.

AD-297 929 Div. 19
(TISTA/GEC) OTS price $2.60

Army Missile Command, Redstone Arsenal, Huntsville, Ala.
ANALYSIS OF AN AIR SUPPORTED PENDULOUS NORTH-SEEKING GYRO,
by James V. Johnston. 4 Jan 63, 16p. (Rept. no. RG TR 63-1)
(DA Proj. 1-B-2-79191-D-678)
Unclassified report

DESCRIPTORS: *Gyro compasses, Dynamics, Stabilization, Instrumentation, Mathematical analysis, Air, Gas bearings.

AD-298 124 Div. 19
(TISTW/JEA) OTS price $10.10

National Aviation Facilities Experimental Center, Atlantic City, N. J.
EVALUATION OF A HONOLULU TERMINAL RADAR SERVICE AREA AND THE HAWAIIAN ISLANDS DOMESTIC ENROUTE AREA.
Final rept.,
by R. Cassell, R. Conway and others. Dec 62, 1v. (Proj. 101-120V)
Unclassified report

Original contains color plates; all ASTIA reproductions will be in black and white. Original may be seen in ASTIA Hq.

DESCRIPTORS: *Airport radar systems, Air traffic control systems, Radar navigation, Runways, Navigational aids, Radar equipment, Simulation.

20. NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

AD-297 052 Div. 20
(TISTW/PCR) OTS price $2.60

Sandia Lab., Albuquerque, N. Mex.
PEACEFUL USES OF NUCLEAR EXPLOSIVES.
Report on Project Plowshare,
by Wilbur C. Buckheit. 1 Sep 62, 27p. incl. illus. table.
Unclassified report

DESCRIPTORS: *Nuclear explosions, *Nuclear industrial applications, Nuclear bombs, Nuclear engineering, Power, Production, Radioactive isotopes, Mining engineering, Water supplies, Dams, Design, Costs, Underground explosions, Cratering, Bibliographies.

AD-297 107 Div. 20, 30
(TISTP/WH) OTS price $3.60

American Machine and Foundry Co., Alexandria, Va.
IMPROVEMENTS OF RADIAC SET AN/PDR-58(XN-1).
Final development rept., May 62-Jan 63.
Jan 63, 28p. incl. illus. tables, 4 refs.
(Contract NObsr-87484)
Unclassified report

DESCRIPTORS: *Neutron counters, *Scintillation counters, Neutron scattering, Thermal neutrons, Fast neutrons, Health physics instrumentation, Circuits.

An experimental program was conducted to improve the neutron energy response of the neutron scintillation detector of the AN/PDR-58 (XN-1) Neutron Survey Meter. The final neutron detector developed very closely approximates the mrem/hr per unit neutron flux for neutron energies from 0.025 ev to 15 Mev as specified in NBS Handbook 63. In addition, the final detector has a much higher over-all sensitivity. (Author)

AD-297 213 Div. 20, 25
(TISTP/JW) OTS price $2.60

American Meteorological Society, Boston, Mass.
A NEW RADIATION CHART (Novaia Radiatsionnaia Nomogramma),
by Helgi Niilisk, tr. by Myron Ricci. Nov 62, 19p. incl. illus. tables, 46 refs. (Research trans. no. T-R-392 from Akademiia Nauk Estonskoi SSR. Izvestiia, Seriia Fiziko-Matematicheskikh i Tekhnicheskikh Nauk, No. 4, pp. 329-339, 1961)
(Contract AF 19(604)6113)
Unclassified report

DESCRIPTORS: Thermal radiation, Atmospherics, Fluxmeters, Absorption, Tables.

Constructs the integral transmission function of the atmosphere by considering the mutual effect of water vapor, carbon dioxide, and ozone on the absorption of thermal radiation in the atmosphere. On the basis of this new transmission function, it is possible to solve the problem of constructing a radiation chart which is sufficiently accurate and convenient from a practical point of view. This work completes a number of studies which were devoted to the problem of calculating the fluxes of thermal radiation in the atmosphere. (Author)

AD-297 345 Div. 20, 2
(TISTB/AW) OTS price $1.60

Naval Research Lab., Washington, D. C.
FISSION PRODUCT RADIOACTIVITY IN THE AIR ALONG THE 80TH MERIDIAN (WEST) DURING 1961,
by L. B. Lockhart, Jr., R. L. Patterson, Jr., and others. 18 Jan 63, 14p. incl. illus. tables, 15 refs. (NRL rept. no. 5869)
Unclassified report

DESCRIPTORS: *Fission product activity, *Atmospheric pollution, Distribution, Periodic variations, Counting methods, Air, Radiochemistry, Radioactive decay, Radioactive fallout, Tests, Atmosphere, Nuclear explosions.

The concentrations of fission product radioactivity in the atmosphere continued the trends exhibited since the beginning of the moratorium on nuclear testing, namely, a clearly defined seasonal variation in activity at sites in the northern hemisphere, together with a less obvious one in the southern hemisphere, and a tendency toward equilibration of the activity concentrations in the two hemispheres, through both a slowly decreasing concentration of fission products in the atmosphere north of the equator and an increase south of the equator. Prior to reinitiation of the Soviet nuclear testing program in September 1961, the natural radioisotope Pb210 had become a significant contributor to the total long-lived beta activity in the atmosphere. After September 1961, the fission product radioactivity in the northern hemisphere increased a hundredfold or more; a small but measurable transfer of the activity to the southern hemisphere occurred during the last months of 1961. (Author)

AD-297 403 Div. 20, 15
(TISTP/TL) OTS price $6.60

Naval Ordnance Lab., White Oak, Md.
THE EXISTENCE AND CALCULATION OF SOLUTIONS OF CERTAIN INTEGRO-DIFFERENTIAL EQUATIONS IN SEVERAL DIMENSIONS,
by A. Douglis. 4 Dec 62, 59p. 4 refs. (Rept. no. NOLTR 62-193)
Unclassified report

DESCRIPTORS: *Partial differential equations, *Difference equations, Neutron, Inequalities, Energy, Theory, Transport properties.

Boundary and initial value problems are solved for linear integro-differential equations in several dimensions of a type including linearized forms of Boltzmann's equation. The methods of calculation are based on finite differences and are thus suitable for calculation. (Author)

AD-297 512 Div. 20, 8
(TISTW/PCR) OTS price $1.10

Litton Systems, Inc., Woodland Hills, Calif.
(No title).
Progress rept. for Feb 63.
Feb 63, 10p.
(Contract AF 33(657)10584)
Unclassified report

DESCRIPTORS: *Gyroscopes, *Test equipment, Circuits, Materials, Gamma rays, Neutrons, Design, Dosimeters, Amplifiers, Radiation damage.

AD-297 747 Div. 20, 16
(TISTB/CCH) OTS price $2.60

Naval Radiological Defense Lab., San Francisco, Calif.
RADIOSENSITIVITY OF BIOELECTRIC FUNCTIONS OF RAT STOMACH AND CAECUM,
by B. E. Vaughan and A. K. Davis. 8 Jan 63, 28p. (Rept. no. NRDL-TR-611)
Unclassified report

DESCRIPTORS: *X-rays, *Gastrointestinal tract, *Neutrons, Tissues (Biology), Electric potential, Radiobiology, Dosage, Nerves, Energy, Stomach, Radiation effects.

21. NUCLEAR PROPULSION

No Entries

Division 22 - ORDNANCE

22. ORDNANCE

AD-297 028 Div. 22, 14
(TISTW/PCR) OTS price $3.60

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
FEASIBILITY STUDY ON THE USE OF PLASTIC COMPONENTS FOR THE 81 MM MORTAR BIPOD ASSEMBLY,
by Merrill Eig. Feb 63, 39p. incl. illus. tables (Picatinny Arsenal technical rept. no. 3030)
(Proj. 5010.11.842)
Unclassified report

DESCRIPTORS: *Gun mounts, Feasibility studies, Design, Stresses, Mathematical analysis, Strain gages, Elevating gear, Tensile properties, Equations, Pictures, Compressive properties, Mortars, Plastics.

Strain data obtained during firing from gages positioned on the legs of the 81 mm mortar bipod assembly was reported to Picatinny Arsenal by Watervliet Arsenal. The forces exerted on the bipod assembly were determined by analyzing this data. Once this was accomplished the individual forces acting upon components could be calculated. A 45 degree elevation was used, with the bipod traverse assembly located in the central position. The calculated maximum stresses were as follows: a bearing stress of 20,100 psi on the case; and a 2,780 psi stress due to bending and a compressive stress of 22,880 psi for the tube housing. The cover, body, and yoke ring were not significantly stressed. The connector showed a bending stress of 17,900 psi and a shear stress of 13,500 psi. Rolled reinforced plastic tubing was suggested for fabrication of prototype components, as it can be easily machined to the desired shapes and has the required strength. It should be noted that the design strength of the tubing is marginal. For end items, a glass-filled epoxy compression molding compound such as Scotchply 1100 would have the desired strength and other required physical properties. (Author)

AD-297 053 Div. 22
(TISTP/JW) OTS price $1.60

Aerojet-General Corp., Downey, Calif.
PULSE-SENSITIVE ELECTROEXPLOSIVE DEVICES.
Monthly progress rept. no. 7 for Jan 63,
by H. M. Kenworthy. 27 Feb 63, 10p. incl. illus. tables (Rept. no. 0689-01(07)MP)
(Contract N178-8107)
Unclassified report

DESCRIPTORS: *Explosive initiators, Metal films, Heating elements, Ceramic materials, Electric bridges, Electric igniters, Pulse analyzers, Pulse communication system.

AD-297 379 Div. 22
(TISTW/PCR) OTS price $1.60

Naval Ordnance Test Station, China Lake, Calif.
SIMPLIFIED METHODS OF FINDING THE KILL PROBABILITIES OF CLUSTER WEAPONS AGAINST UNITARY TARGETS,
by D. F. Kusterer. Oct 62, 20p. incl. illus.
(Rept. no. NOTS TP 3093)
(WEPTASK RM-3301-001/216-1/F009-01-009)
(NAVWEPS rept. 8075) Unclassified report

DESCRIPTORS: *Bomb clusters, *Kill probabilities, Mathematical analysis, Equations, Curved profiles, Effectiveness, Targets, Cluster warheads.

Similarities and relationships among the graphs of NAVORD REPORT 7019 (A Handbook on the Effectiveness of Cluster Weapons Against Unitary Targets, by Eldon L. Dunn) indicate that salvo kill probabilities can often be estimated for larger numbers of bomblets and larger ratios of delivery standard deviations to target dimensions without further machine computation, either by changing the parameter values of the original graphs according to simple rules or by using generalized graphs derived from the original ones. These methods, which essentially were developed empirically, are supported by an examination of the basic equation of NAVORD REPORT 7019 and the introduction of two appropriate approximations. (Author)

AD-297 503 Div. 22, 29
(TISTW/RD) OTS price $12.00

Rowland and Co., Haddonfield, N. J.
PACKAGING FOR SMALL ARMS AMMUNITION,
by George E. Rowland, W. Warren vol Uffel, Jr. and others. 28 Feb 63, 142p. (Rept. no. 63-28-2)
(Contract DA 36-034-ORD-3670)
Unclassified report

DESCRIPTORS: *Small arms ammunition, *Containers, Design, Transportation, Thermosetting plastics, Thermoplastics, Storage.

AD-297 770 Div. 22, 14
(TISTM/RGR) OTS price $10.10

Stanford Research Inst., Menlo Park, Calif.
PROPAGATION OF STRESS PULSES IN STANDARD LINEAR VISCOELASTIC MATERIALS.
Final rept., pt. 1,
by W. Lai and F. M. Sauer. 4 Aug 61, 113p.
(Contract DA 49-146-xz-018, Proj. SU-2917)
(DASA 1266, pt. 1) Unclassified report

DESCRIPTORS: *Shock waves, *Detonation waves, *Models (Simulations), *Mathematics, Simulation, Viscoelasticity, Soil mechanics, Difference equations, Taylor's series, Air burst, Nuclear explosions, Rods, Velocity, Mechanical waves, Propagation.

AD-297 831 Div. 22
(TISTW/RD) OTS price $2.60

Laboratories for Research and Development, Franklin Inst., Philadelphia, Pa.
DEVELOPMENT OF BROAD-BAND ELECTROMAGNETIC ABSORBERS FOR ELECTRO-EXPLOSIVE DEVICES.
Monthly progress rept., 1-31 Dec 62,
by Paul F. Mohrbach and Robert F. Wood.
31 Dec 62, 20p. (Rept. no. P-B1981-6)
(Contract N178-8087)
Unclassified report

DESCRIPTORS: *Explosives initiators, *Electromagnetic waves, Ferrites, Broadband, Silver, Attenuation, Argon, Dielectrics, Radiofrequency, Attenuators, Coatings, Absorption.

AD-297 988 Div. 22
(TISTW/RD) OTS price $1.60

Picatinny Arsenal, Dover, N. J.
NOMOGRAPHS FOR INTERIOR BALLISTICS,
by Sidney Kravitz. Jan 63, 5p. tables (Technical rept. no. 3035)
Unclassified report

DESCRIPTORS: *Interior ballistics, *Nomographs, *Howitzers.

23. PERSONNEL AND TRAINING

AD-297 919 Div. 22
(TISTW/RD) OTS price $1.60

Army Missile Command, Redstone Arsenal, Huntsville, Ala.
DEVELOPMENT OF THE ELECTRICAL AND FIRE CONTROL SYSTEMS OF THE XM-3 2.75-INCH AREA ROCKET WEAPON SYSTEM FOR THE UH-1B HELICOPTER,
by Charles W. Wingfield. 15 Feb 63, 10p.
(Rept. no. RG-TR-62-6)
Unclassified report

DESCRIPTORS: *Aircraft ammunition, *Rockets, *Aircraft fire control systems, Helicopters, Fire control systems.

AD-298 046 Div. 22
(TISTW/RD) OTS price $2.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
MECHANICAL IMPULSE MEASUREMENTS CLOSE TO EXPLOSIVE CHARGES,
by J. M. Dewey, O. T. Johnson, and J. D. Patterson, II. Nov 62, 29p. (BRL rept. no. 1182)
(DA Proj. 503-04-002)
Unclassified report

DESCRIPTORS: *Air burst, *Blast, *Charges (Explosive), Pentolite, Measurement.

AD-298 098 Div. 22, 25
(TISTW/RD) OTS price $6.60

Pitman-Dunn Labs. Group, Frankford Arsenal, Philadelphia, Pa.
HUMAN FACTORS STUDY OF DESIGN CONFIGURATIONS FOR THE LASER RANGE FINDER,
by A. Charles Karr and James T. O'Connor.
Feb 63, 62p. (Rept. no. R-1664)
(DA Proj. 513-07-010)
Unclassified report

DESCRIPTORS: *Lasers, *Range finding, *Fire control systems, Human engineering, Artillery.

AD-298 115 Div. 22
(TISTM/BRW) OTS price $3.60

Picatinny Arsenal, Dover, N. J.
COMBUSTIBLE IGNITER TUBES FOR CHARGE, PROPELLING, M51 AND XM115 FOR CANNON, HOWITZER, 155MM, T255 AND T258,
by Edward Daniels and Isidore G. Nadel. Feb 63, 17p. illus. (Tech. rept. no. 3052)
Unclassified report

DESCRIPTORS: *Igniters, Nitrocellulose, Propelling charges, Howitzers, Materials.

AD-298 116 Div. 22
(TISTM/BRW) OTS price $3.60

Picatinny Arsenal, Dover, N. J.
SURVEILLANCE AND CYCLING OF CAST COMBUSTIBLE CARTRIDGE CASE FORMULATIONS,
by Sydney Axelrod and Vladimir Mirko. Feb 63, 1v. (Tech. rept. no. 3066)
(DA Proj. TB5-24)
Unclassified report

DESCRIPTORS: *Cartridge cases, Ballistics, Mechanical properties, Temperature, Stability, Propellant grains, Binders, Storage.

AD-297 378 Div. 23
(TISTB/LMH) OTS price $1.10

Laboratory of Aviation Psychology, Ohio State U. Research Foundation, Columbus.
TRAINING FOR PARTIAL-PANEL CONTROL SKILLS,
by George E. Briggs. Nov 62, 10p. incl. illus. tables, 4 refs.
(Contract N61339-836)
(NAVTRADEVCEN 836-2) Unclassified report

DESCRIPTORS: *Aviation personnel, Training devices, Group dynamics, Learning, Display systems, Effectiveness, Errors, Performance tests, Vision, Training.

Several schedules of training were compared for the acquisition of vehicular control skill in a two-dimensional tracking task. The final transfer task utilized only two information displays (system error in both task dimensions). The training tasks utilized a five-display and a three-display-panel condition, and the several training schedules emphasized practice on one or the other of these panels prior to final transfer. None of the schedules resulted in performance on the final, two-display task which was superior to performance attained by a control group of subjects who trained only on the two-display condition throughout the training period. It appears that these negative results were due, in part, to the relative simplicity of the basic tracking task. (Author)

AD-297 383 Div. 23, 12
(TISTW/PCR) OTS price $8.60

Dunlap and Associates, Inc., Washington, D. C.
METHODOLOGY FOR ANALYSIS OF FBM FIRE CONTROL AND MISSILE SYSTEM TRAINING. SUPPLEMENT.
Dec 62, 94p. incl. tables, refs. (Rept. no. ND 63-27, Suppl.)
(Contract NOp-1351)
Unclassified report

DESCRIPTORS: *Guided missile personnel, *Submarine personnel, *Military training, Tests, Test methods, Test construction (Psychology), Effectiveness, Fire control systems, Ballistic missile submarines, Analysis.

The purpose of this volume is to describe and evaluate the methods used in the analysis of the U.S. Naval Guided Missiles School's FBM Fire Control and Missile System training at Dam Neck, Virginia. This description encompasses not only those procedures that should be employed, but also those that should not. (Author)

AD-297 443 Div. 23
(TISTB/DGH) OTS price $2.60

System Development Corp., Santa Monica, Calif.
PROBLEMS ENCOUNTERED IN DEVELOPING AND MAINTAINING A FIELD SYSTEM TRAINING PROGRAM,
by L. T. Alexander, J. D. Ford, and others.
18 Sep 59, 21p. (Rept. no. SP-107)
Unclassified report

DESCRIPTORS: *Training, *Air Defense Command, Radar operators, Air traffic controllers, Human engineering, Data processing systems, Information retrieval, Selection, Motivation, Simulation, Symposia, Military requirements, Air control centers, Personnel.

Division 24 - PHOTOGRAPHY AND OTHER REPRODUCTION PROCESSES
Division 25 - PHYSICS

Contents:
Requirements for a field system training program
The appropriate contribution of simulation techniques to system training
Man-machine training techniques - TORing, feedback, and debriefing
Problems of conducting system training in a military culture
The training problems of future systems

AD-297 568 Div. 23
(TISTB/DGH) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
TRAINING FOR FLIGHT INTO COSMOS,
by V. V. Parin. 21 Jan 63, 7p. (Trans. no. FTD-TT-62-1610 from Znaniye Sila, No. 4, pp. 23-24, 1961)
Unclassified report

DESCRIPTORS: *Astronauts, Cybernetics, Feasibility studies, Training.

AD-297 838 Div. 23, 1
(TISTB/AW) OTS price $8.10

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
CRITERIA FOR ACCEPTABLE REPRESENTATION OF AIRPLANE DYNAMIC RESPONSES IN SIMULATORS USED FOR PILOT TRAINING,
by F. D. Newell. Oct 62, 80p.
(Contract N61339-1146)
(NAVTRADEVCEN TR-1146-1) Unclassified report

DESCRIPTORS: *Flight simulators, Effectiveness, Pilots, Training devices, Sensitivity.

24. PHOTOGRAPHY AND OTHER REPRODUCTION PROCESSES

No Entries

25. PHYSICS

AD-297 018 Div. 25
(TISTP/WH) OTS price $15.00

Washington U., Seattle. Coll. of Engineering.
RADIATION FROM SOURCES IN MAGNETOPLASMA WITH A SEPARATION BOUNDARY,
by George Tyras, H. Myron Swarm, and Akira Ishimaru. June 62, 209p. incl. illus. 26 refs.
(Technical rept. no. 71)
(Contract AF 19(604)4098, Proj. 5635; In cooperation with Boeing Co., Seattle, Wash.)
(AFCRL 62-785) Unclassified report

DESCRIPTORS: *Plasma physics, *Magnetic fields, *Radio waves, *Propagation, *Antennas.

A class of problems of electromagnetic radiation from elementary sources in the presence of an anisotropic plasma half-space is treated. Part I concerns the fields of a horizontal magnetic dipole in and out of the magnetoplasma when the steady magnetic field is along the axis of the dipole. Part II is devoted to the problems of the electric current line source. The case of the steady magnetic field normal to the line source is rigorously formulated and the field integrals are evaluated with no restriction on the wave frequency or the magnitude of the steady magnetic field. Part III is devoted to the problems of the magnetic current line sources. The case of the steady magnetic field normal to the line source is rigorously formulated and the field integral evaluated with no restriction on the wave frequency or the magnitude of the steady magnetic field. (Author)

AD-297 029 Div. 25
(TISTP/JVP) OTS price $1.60

Rensselaer Polytechnic Inst., Troy, N. Y.
FLEXURE OF CIRCULARLY ANISOTROPIC CIRCULAR PLATE WITH ECCENTRIC LOAD,
by I. A. Minkarah and W. H. Hoppmann, II.
Feb 63, 13p. incl. illus. 5 refs.
(Contract DA 30-115-509-ORD-912)
Unclassified report

DESCRIPTORS: *Stresses, *Sheets, *Deformation, Anisotropy, Load distribution, Partial differential equations, Elasticity, Determination, Mathematical analysis.

A theoretical solution is obtained for the deformation under eccentric concentrated force of a circularly orthotropic plate with so called simply-supported or momentless edge. The special case of the anisotropic plate is then discussed for use in elastic compliance tests.

AD-297 033 Div. 25, 8
(TISTW/JEA) OTS price $4.00

Shockley Transistor Corp., Mountain View, Calif.
FAILURE MECHANISMS IN SILICON SEMICONDUCTORS.
Final rept.,
by Hans J. Queisser. 15 Jan 63, 287p. incl. illus. tables, 15 refs.
(Contract AF 30(602)2556, Proj. 5519)
(RADC TDR 62-533) Unclassified report

DESCRIPTORS: *Semiconductor devices, *Semiconductors, *Crystal lattice defects, Impurities, Reliability, Crystal lattices, Diffusion, Crystals, Transistors, Thermistors, Thermal conductivity, Failures (Mechanics), Crystal growth, Solid state physics, Diodes (Semiconductors), Measurement, Crystal structure, Stability, Misalignment, Silicon, Electrical properties.

Lattice defects in silicon and their effects on performance and reliability of semiconductor devices are investigated. Grain boundary dislocations, twin boundaries, and stacking faults in epitaxial layers are also investigated. Gallium diffusion along grain boundaries is studied. Impurity atmospheres are found to influence the electrical properties of dislocations. A new method of bicrystal growing is described. Stacking faults originate from oxygen impurities at the substrate used for epitaxy. The faults cause preferential microplasma breakdown. The problem of thermal lateral instability

in transistor and thermistor structures is also investigated. Experimental evidence is presented for the existence of localized hot spots with elevated current densities and temperatures. This phenomenon is related to the second breakdown failure mechanisms in transistors. (Author)

AD-297 039 Div. 25, 20, 7
(TISTP/MB) OTS price $10.50

Atomics International, Canoga Park, Calif.
BASIC RESEARCH IN THERMIONIC ENERGY CONVERSION.
Annual technical summary rept. no. 2, 1 Nov 61-31 Oct 62,
by C. Warner, III, L. K. Hansen and others.
31 Oct 62, 133p. incl. illus. tables, 23 refs.
(Rept. no. AI-7979)
(Contract Nonr-319200)
Unclassified report

DESCRIPTORS: *Thermionic emission, Statistical mechanics, Cesium, Space charges, Transport properties, Adsorption, Energy conversion, Nuclear power plants, Purification, Vaporization, Diodes, Theory.

This report presents the results of the past year's work in a continuing program to investigate basic processes in thermionic energy conversion important to a thermionic nuclear power plant for naval applications. The previous work was reported in AI-6799, ''First Summary Report of Basic Research in Thermionic Conversion Processes.'' The subjects discussed in the present report are: statistical mechanics of cesium adsorption, space charge analysis for low pressure thermionic diodes, Emission requirements for removal of space charge barriers, unignited mode of thermionic converters, interpretation of volt-ampere characteristics, vaporization and deposition at cesium covered surfaces, and cesium purification. (Author)

AD-297 057 Div. 25, 4
(TISTP/MB) OTS price $1.60

General Electric Co., Schenectady, N. Y.
RESEARCH ON CdTe.
Quarterly progress rept. no. 7, 1 Nov 62-31 Jan 63,
by M. R. Lorenz, B. Segall and R. E. Halsted.
31 Jan 63, 17p. incl. illus. tables, refs.
(Contract AF 33(616)8264)
Unclassified report

DESCRIPTORS: *Tellurides, *Single crystals, Cadmium compounds, Semiconductors, Paramagnetic resonance, Hall effect, Solid state physics, Absorption spectra, Theory, Impurities, Electrical properties, Transport properties.

Investigation concerns the identity and properties of native defects in CdTe. In the course of studying the electrical properties of high-purity single crystals of CdTe, a new center, thought to be a native double acceptor, has been observed. Another approach toward the identification of point defects is the technique of electron paramagnetic resonance. Two resonance lines have been observed so far. A line with a g value of 1.68 is believed to be due to shallow donor impurities. Examinations were also made of fluorescent emission spectra in the zone-refined CdTe and in CdTe subjected to various heat treatments. Some data has been taken with samples immersed in He. (Author)

AD-297 073 Div. 25
(TISTP/JW) OTS price $2.60

Perkin-Elmer Corp., Norwalk, Conn.
RUBY IMPROVEMENT FOR LASERS-TASK II.
Quarterly rept. no. 2, 1 Aug-31 Oct 62,
by J. G. Atwood and G. W. Dueker. 30 Nov 62, 19p. incl. illus. table, ref. (Rept. no. PE-TR-M7247)
(Contract DA 36-039-sc-89091, Proj. 3A-99-21-001-05)
Unclassified report

DESCRIPTORS: *Ruby, *Lasers, Instrumentation, Interferometers, Polariscopes, Mirrors, Optical materials, Crystals, Production.

AD-297 083 Div. 25, 20
(TISTP/WH) OTS price $3.60

Air Force Special Weapons Center, Kirtland Air Force Base, N. Mex.
EXPERIMENTAL TESTS FOR THE ACCELERATION OF TRAPPED PARTICLES,
by Richard L. Kaufmann. Jan 63, 41p. incl. illus. table, 37 refs. (Rept. no. AFSWC TDR 62-133)
(Proj. 7811)
Unclassified report

DESCRIPTORS: *Charged particles, *Exosphere, *Van Allen radiation belt, *Cosmic rays, *Magnetic fields, *Albedo, *Plasma physics, Electrons, Spacecraft, Acceleration, Protons, Neutrons, Upper atmosphere.

Mechanisms which could result in the acceleration of charged particles within the magnetosphere are discussed in terms of the responses expected from experimental instruments as they pass through acceleration regions. A series of experimental tests is outlined which can determine if acceleration of trapped particles is important. The mechanisms discussed include Fermi acceleration, which can accelerate protons to tens or hundreds of kilovolts and can increase the energy of trapped electrons several hundred-fold before they are lost in the dense atmosphere. A change in the intensity of the solar wind or in the strength of a ring current can change the energy of trapped particles by the betatron mechanism. Electrons can be accelerated to kilovolt energies by the setting up of plasma oscillations, by acceleration within moving clouds or by intrusions of solar plasma. Finally, particles may be accelerated to energies of 10 kilovolts or more in the vicinity of neutral lines. (Author)

AD-297 203 Div. 25, 6
(TISTW/JEA) OTS price $4.60

Armour Research Foundation, Chicago, Ill.
UNCOOLED IR DETECTOR FOR THE TEN MICRON REGION.
Final rept., 1 Mar 62-28 Feb 63,
by William D. Brennan. 25 Feb 63, 31p. incl. illus. 8 refs. (Rept. no. ARF-1208-12A)
(Contract NOw 62-0751-c)
Unclassified report

DESCRIPTORS: *Infrared detectors, *Transport properties, *Crystals, *Photoconductivity, *Crystal detectors, *Infrared radiation, Heat of activation, Cadmium compounds, Ionization, Electrons, Electrostatics, Sulfides, Crystal lattice, Energy, Sensitivity, Crystal structure, Crystal lattice defects, Optical equipment, Semiconductors, Photoelectrical materials, Absorption.

Division 25 - PHYSICS

The development of an uncooled infrared detector for the 8 to 12 micron atmospheric window is discussed. In contrast to all other quantum infrared detectors, the principle of operation of the proposed detector does not involve free carrier generation by infrared radiation. Instead, this detector uses the absorption of infrared energy by excitons to quench an exciton-induced photoconductivity. Methods and techniques to observe exciton-induced photoconductivity and quenching by infrared radiation are discussed. During the course of the work some 90 crystals were examined, and while the quenching effect was never observed, 11 of these crystals appear to exhibit the required exciton processes. The experimental procedures are being modified to emphasize the observation of exciton transport and to remove some interferences that might have inhibited or masked the quenching in previous experiments. (Author)

AD-297 209 Div. 25
(TISTP/JW) OTS price $4.60

American Meteorological Society, Boston, Mass.
DETERMINATION OF THE EXCITATION FUNCTIONS OF THE ENERGY LEVELS OF Hg ATOMS ACCORDING TO OPTICAL EXCITATION FUNCTIONS (Opredelenie Funktsii Vozbuzhdeniia Energeticheskikh Urovnei Atomov Rtuti no Opticheskim Funktsiiam Vozbuzhdeniia),
by I. P. Zapesochnyi, tr. by Myron Ricci.
Nov 62, 40p. incl. illus. tables, 5 refs.
(Research Trans. no. TR-396 from Leningradskii Universitet Vestnik, no. 11, pp. 67-93, 1954)
(Contract AF 19(604)6113)
Unclassified report

DESCRIPTORS: *Excitation, *Mercury, Optical properties, Energy, Electrons, Measurement, Functions, Atomic properties.

AD-297 239 Div. 25, 8
(TISTW/PCR) OTS price $2.60

Norwegian Defence Research Establishment.
EXPERIMENTS WITH MAGNETOSTATIC PUMPING OF TRANSVERSE ELECTRON BEAM WAVES,
by K. Blotekjaer, B. Malsnes and A. Nordbotten.
20 Oct 62, 18p. incl. illus. 11 refs. (Technical note 12)
(Contract AF 61(052)531)
(RADC TDR 63-48) Unclassified report

DESCRIPTORS: *Electron beams, *Electromagnetic waves, *Pumps, Electron tubes, Design, Amplifiers, Cyclotron resonance phenomena, Synchronization (Electronics), Coupling circuits, Noise, Magnetic fields, Quadrupole moments, Tests, Photographs.

An experimental tube designed to investigate magnetostatic pumping of cyclotron and synchronous waves on an electron beam is described. The tube consists essentially of an input coupler and an output coupler, separated by a long drift tube, which is part of the vacuum envelope. The magnetostatic structures are mounted on the drift tube, external to the vacuum system, and they are therefore readily interchangeable. Various structures are described, the experimental program is discussed, and some results are presented. Unexpectedly high current interception foiled many of the experiments. The beam expansion and interception appeared to be much larger than predicted by theory, and the mechanism behind it is not fully understood. (Author)

AD-297 288 Div. 25, 2
(TISTP/JW) OTS price $8.60

Geophysical Inst., U. of Alaska, College.
RADIO PROPERTIES OF THE AURORAL IONOSPHERE. PART 1.
Final rept.,
by Leif Owren, C. G. Little and others. Mar 62,
88p. incl. illus. tables, 34 refs.
(Contract AF 30(635)2887, Proj. 5535)
(RADC TR 61-217, pt. 1)
Unclassified report

DESCRIPTORS: *Ionosphere, *Radio waves, Dielectrics, Diffraction, Solar radiation, Very high frequency, Ultra high frequency, Aurorae, Scattering.

AD-297 390 Div. 25, 8
(TISTP/JW) OTS price $1.10

Naval Research Lab., Washington, D. C.
A DIODE DIGITAL-TO-ANALOG CONVERSION TECHNIQUE,
by J. Ihnat. 30 Jan 63, 10p. incl. illus. tables (NRL rept. no. 5866)
Unclassified report

DESCRIPTORS: *Digital-to-analog converters, *Electric currents, Switching circuits, Reliability, Imput-output devices, Control systems, Electrical networks, Diodes, Data transmission systems.

The transformation of information which is in digital form to an analogous form involving electrical potentials or currents is called digital-to-analog conversion. The transformation is approximate since errors are introduced during conversion. Various techniques have been developed to minimize these errors; the most popular ones are the weighted resistor method and the ladder arrangement. The weighted resistor can be used as the input to a summing amplifier, and the voltage input errors to the weighted resistor can be reduced through the use of a balanced-current diode switching circuit. Experimental results derived from an investigation of the characteristics of the diode switching circuit showed a maximum switching error of $\pm 6 \times 10$ to the -3rd power volts. The calculated value for the worst case of relative output error for the converter is 0.065 percent when the switch is used as the input to the weighted resistor. Actual measurements performed on the output of the 11-bit input converter gave a maximum relative error of only 0.027 percent. The digital-to-analog conversion speed amounted to 20 microseconds for the case considered. (Author)

AD-297 399 Div. 25, 9
(TISTP/JW) OTS price $10.10

Naval Ordnance Lab., White Oak, Md.
SCATTERING OF LIGHT AT NORMAL INCIDENCE BY DIELECTRIC CYLINDERS WITH REFRACTIVE INDEX IN THE RANGE m = 1.400 TO m = 3.00--SCATTERING COEFFICIENTS,
by Louis F. Libelo. 24 Sep 62, 122p. incl. tables, 14 refs. (Rept. no. NOLTR 62-161)
Unclassified report

DESCRIPTORS: *Light, *Dielectrics, Refractive index, Electromagnetic properties, Radiation effects, Cylindrical bodies, Polarization, Scattering, Refraction.

For the refractive indexes m = 1.40, 1.50, 1.60,

2.00, and 3.00 tables of the complex scattering coefficients are presented. These coefficients arise in the problem of the scattering by a homogeneous, isotropic, dielectric, infinite circular cylinder of normally incident, linearly polarized, plane electromagnetic radiation. The numerical results were obtained by means of the IBM 7090 computer system of the U. S. Naval Ordnance Laboratory. The tables contain not only the scattering coefficients for the incident plane wave polarized parallel to the cylinder axis, but also those for the incident radiation polarized normal to this axis. (Author)

AD-297 438 Div. 25
(TISTP/JW) OTS price $4.60

RCA Labs. Div., Radio Corp. of America, Princeton, N. J.
RESEARCH ON THE VOLUME RECOMBINATION OF CESIUM IONS.
Interim engineering rept. no. 1, 1 Oct 60-31 Mar 62,
by P. V. Goedertier and J. M. Hammer. 15 Oct 62, 39p. incl. illus. tables, 56 refs.
(Contract DA 44-177-TC-694, Proj. 9R99-20-001-08)
(TCREC TR 62-82) Unclassified report

DESCRIPTORS: *Plasma physics, *Cesium, Ions, Instrumentation, Measurement, Electron density, Recombination reactions, Ionization.

An apparatus to implement a new method of measuring radiative recombination based on the passage of an ion beam through an electron cloud has been constructed. Initial tests of the sub-components and of the apparatus itself give some indication that the method will work. The method and the apparatus are described in detail and the implications of the initial measurements are discussed. (Author)

AD-297 458 Div. 25
(TISTM/ODN) OTS price $16.50

Aeronutronic, Newport Beach, Calif.
INFRARED TRANSMISSION STUDIES. VOLUME II. THE INFRARED ABSORPTION OF WATER VAPOR.
Final rept.,
by P. J. Wyatt, V. R. Stull, and G. N. Plass.
20 Sep 62, 253p. incl. illus. tables, 7 refs.
(Contract AF 04(695)96, Proj. 4479-730F; Continuation of AF 19(604)7479, Proj. 4479)
(SSD TDR 62-127, vol. 2) Unclassified report

DESCRIPTORS: *Water vapor, Molecular structure, Absorption, Vibration, Frequency, Tables, Experimental data, Theory, Equations, Infrared spectroscopy.

The infrared absorption of water vapor has been calculated over a wide range of path length, pressure, and temperature from 1000 to 10,000 reciprocal cm. The results are presented in extensive tables which give the transmission over intervals of 2.5 reciprocal cm. at wave numbers below 3400 reciprocal cm. The average transmission over intervals of 20, 50, and 100 reciprocal cm. is given over the complete frequency range. The calculated data representing the intensity, position, and number of spectral lines in a given frequency interval is tabulated in a form which is useful for transmission calculations. All lines from all isotopic species having an intensity greater than 10 to the -8th power of the strongest line in an absorption region were included in the calculation. The quasi-random model for the representation of band spectra is discussed in detail. Among its features are the possibility of representing the absorption by a series of lines which are arranged neither at random nor in a regular way. (Author)

AD-297 459 Div. 25
(TISTP/MH) OTS price $3.60

Microwave Lab., Stanford U., Calif.
STUDIES OF PLASMA OSCILLATIONS.
Quarterly status rept. no. 12, 1 Sep-30 Nov 62.
Jan 63, 30p. incl. illus. 18 refs. (ML rept. no. 999)
(Contract AT (04-3)326)
Unclassified report

DESCRIPTORS: *Plasma oscillations, *Discharge tubes, Suppressors, Electrical impedance, Probes, Stability, Noise.

Plasma oscillations were studied with the objective of determining and explaining the mechanism for the growth of instabilities and oscillations in a gaseous discharge, with particular emphasis on the action of sheaths and wave interactions with particles in the discharge. The effect of parameters such as geometric shapes and boundaries, magnetic field, pressure and velocity distributions will be taken into account. Close examination of supposedly quiescent plasma generally shows the presence of fluctuations in discharge parameters such as anode voltage, current number density, light output, etc. These may be coherent or incoherent. The objectives of this program are threefold: (1) to observe the characteristics of these fluctuations (which shall be termed 'noise'); (2) to determine their generation mechanisms; and (3) to suppress them as far as possible. Previous reports dealt with observations of some noise characteristics and suggestions for the generation mechanisms. Some success in suppression has already been achieved by the use of grids and magnetic fields. In this report, further experiments are described. (Author)

AD-297 467 Div. 25
(TISTP/JW) OTS price $2.60

Textile Research Inst., Princeton, N. J.
DETERMINATION OF NON-FLOW SHRINKAGE RATIO IN ORIENTED FIBERS,
by D. Prevorsek and A. V. Tobolsky. Feb 63, 16p. illus. (Technical rept. no. 33)
(Contracts Nonr-09000 and Nonr-09001)
Unclassified report

DESCRIPTORS: *Fibers, Crystal structure, X-ray diffraction analysis, Radiation effects, Fatigue (Mechanics), Structural properties.

AD-297 479 Div. 25
(TISTP/JW) OTS price $10.10

General Telephone and Electronics Labs., Inc., Palo Alto, Calif.
INVESTIGATION OF MODULATIONS ARISING FROM INTERACTION OF ELECTROMAGNETIC WAVES WITH A PLASMA.
Rept. for 30 Mar 61-31 Oct 62,
by S. Tetenbaum, E. Barrett, and H. Gitterman.
15 Nov 62, 118p.
(Contract AF 30(602)2477, Proj. 5561)
(RADC TDR 62-613) Unclassified report

DESCRIPTORS: *Electromagnetic waves, Magnetic fields, Helium, Microwaves, Nonlinear systems, Plasma physics.

Division 25 - PHYSICS

AD-297 480 Div. 25, 30, 10
(TISTM/EJH) OTS price $1.60

Texaco Experiment, Inc., Richmond, Va.
INVESTIGATION OF THE DISSOCIATION CHEMISTRY OF -NF2 COMPOUNDS.
Quarterly summary rept. for Aug-Oct 62,
by U. V. Henderson, Jr. and P. L. Goodfriend.
1 Nov 62, 14p. (Rept. no. EXP 223; Technical memo. no. TM-1383)
(Contract Nonr-188300)
Unclassified report

DESCRIPTORS: *Dissociation, *Gases, *Liquid rocket oxidizers, *Organic compounds, *Amines, Compressors, Flash lamps, Design, Mass spectroscopy, Photochemistry, Laboratory equipment, Electronic equipment, Oxidizers, Test methods, Fluorides, Test equipment.

AD-297 481 Div. 25
(TISTP/MB) OTS price $3.60

Office of Research Administration, U. of Michigan, Ann Arbor.
ACOUSTIC BACKGROUND AT THE EARTH'S SURFACE.
Final rept.,
by John W. Wescott and S. Steven Kushner.
Feb 63, 31p. (Rept. no. 3746-35-F)
(Contract DA 20-018-ORD-22840)
Unclassified report

DESCRIPTORS: *Noise, Turbulence, Sound, Sound generators, Airplane noise, Microwave relay systems, Data transmission systems, Wind, Troposphere, Sound transmission, Sound ranging, Detectors, Acoustic detectors.

AD-297 485 Div. 25, 14
(TISTM/BRW) OTS price $6.60

Rocket Propulsion Lab., Edwards, Calif.
SPARK SOURCE MASS SPECTROMETRIC ANALYSIS OF NON-HOMOGENEOUS SAMPLES.
Final rept.,
by A. V. Jeasen, B. B. Goshgarian, and N. E. Dane. Jan 63, 61p.
(RTD TDR 63-1) Unclassified report

DESCRIPTORS: *Solids, Electric arcs, Sparks, Radiofrequencies, Refractory materials, Boron compounds, Carbides, Nitrides, Oxides, Titanium, Sodium compounds, Borohydrides, Mass spectroscopy.

AD-297 489 Div. 25, 4
(TISTM/ODN) OTS price $3.60

Frick Chemical Lab., Princeton U., N. J.
ASPECTS OF VISCOELASTICITY OF POLYMERS,
by Arthur V. Tobolsky. Feb 63, 24p. illus. tables.
(Contract Nonr-185807, Proj. NR 356-377)
(ONR technical rept. RLT-58)
Unclassified report

DESCRIPTORS: *Polymers, *Styrene plastics, *Acrylic resins, *Organic compounds, Transition temperature, Mechanical properties, Relaxation time, Stresses, Theory, Copolymerization, Rubber, Elasticity, Temperature, Viscoelasticity.

AD-297 491 Div. 25, 8
(TISTM/AM) OTS price $2.60

Little, Arthur D., Inc., Cambridge, Mass.
SUPERCONDUCTIVE EFFECTS IN THIN FILMS.
Interim engineering rept. no. 4, 15 Oct 62-15 Jan 63,
by S. Shapiro. 15 Feb 63, 20p. (Rept. no. C-64380)
(Contract AF 33(657)7915)
Unclassified report

DESCRIPTORS: *Semiconductors, *Superconductivity, *Vapor plating, Superconductors, Aluminum, Oxides, Oxidation, Tin, Experimental data, Silver solders, Diodes, Cryogenics, Films, Effectiveness, Semiconducting films.

AD-297 505 Div. 25, 17, 14
(TISTM/AMS) OTS price $1.25

Borg-Warner Corp., Chicago, Ill.
THEORY OF THE THERMAL CONDUCTIVITY OF METALS, ALLOYS, AND SEMICONDUCTORS.
Final rept., June 61-June 62 on Chemistry and Physics of Materials,
by John R. Madigan. Jan 63, 42p.
(Contract AF 33(616)7374, Proj. 7360)
(ASD TDR 62-74, pt. 2) Unclassified report

DESCRIPTORS: *Thermal conductivity, Metals, Alloys, Semiconductors, Crystal lattices, Crystal lattice defects, Phonons, Thermal diffusion, Heat transfer, Kinetic theory, Transport properties, Relaxation time, Statistical mechanics, Germanium alloys, Silicon alloys, Theory.

AD-297 506 Div. 25
(TISTM/BRW) OTS price $.75

Southampton U. (Gt. Brit.).
THE DAMPING OF ALUMINUM HONEYCOMB SANDWICH BEAMS.
Summary rept., July 60-Nov 61 on Metallic Materials,
by D. J. Mead and G. R. Froud. Jan 63, 24p.
(Contract AF 61(052)504, Proj. 7351)
(ASD TDR 62-1096) Unclassified report

DESCRIPTORS: *Beams (Structural), *Sandwich construction, Honeycomb cores, Vibration, Adhesives, Sandwich panels, Mechanics, Theory, Aluminum alloys, Stresses, Acoustic properties, Damping.

AD-297 508 Div. 25
(TISTP/MH) OTS price $2.60

University of Southern Calif., Engineering Center, Los Angeles.
RADIATION FROM AN AXIALLY SLOTTED CYLINDER COATED WITH AN INHOMOGENEOUS DIELECTRIC SHEATH,
by Cavour W. H. Yeh and Z. A. Kaprielian.
Dec 62, 20p. (Rept. no. EE-17; USCEC rept. no. 82-207)
(Contract AF 19(604)6195, Proj. 4642)
(AFCRL-62-963) Unclassified report

DESCRIPTORS: *Plasma physics, *Radio fields, *Antenna radiation patterns, Atmosphere reentry, Partial differential equations, Dielectric properties, Slot antennas.

AD-297 523 Div. 25, 5
(TISTM/ODN) OTS price $3.60

Diamond Ordnance Fuze Labs., Washington, D. C.
ENHANCED FARADAY ROTATION IN CESIUM VAPOR,

by Louis Melamed. 20 Nov 62, 40p. (Rept. no. TR-1057)
(DOFL proj. no. 16100)
Unclassified report

DESCRIPTORS: *Cesium, *Magneto-optic effect, *Light communication systems, Vapors, Absorption, Polarization, Light, Infrared radiation, Magnetic fields, Audiofrequency, Radiofrequency, Sensitivity, Magnetometers, Theory.

AD-297 567 Div. 25, 14
(TISTM/ODN) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
METHOD OF DETERMINING THE THERMOPHYSICAL CHARACTERISTICS OF INSULATING MATERIAL BY USING THE IMPULSE OF A SHOCK WAVE AS A HEATER,
by Yu. A. Dem'yanov and N. V. Chereshneva.
16 Jan 63, 3p. incl. illus. 4 refs. (Trans. no. FTD-TT-62-332 from Izvestiya Akademii Nauk SSSR, OTN, Mekhanika i Mashinostroyeniye, No. 1, pp. 153-154, 1961)
Unclassified report

DESCRIPTORS: *Thermal insulation, Shock waves, Heaters, Heat, Thermodynamics, Varnishes, Resistance thermometers, Films.

The known methods of determining the thermophysical characteristics of insulating materials require preparation on appreciable (in size) samples of the test material for their application. Moreover, one often finds in practice materials (lacquer, enamel, paint, etc.) from which it is improbable to make large-size samples while retaining the thin-layer properties of these materials. Determination of the thermophysical properties of such materials is quite difficult. An account is presented of a method for determining the thermophysical properties of insulating materials which permits, in particular, determination of these properties of materials made in the form of thin films. (Author)

AD-297 571 Div. 25
(TISTP/WH) OTS price $2.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
CERTAIN PROBLEMS IN THE DYNAMICS OF A SYSTEM OF SOLID BODIES,
by A. I. Lur'ye. 14 Jan 63, 22p. incl. illus. 2 refs. (Trans. no. FTD-TT-62-1152 from Trudy Leningrad Politekhn. In-Ta, No. 210, pp. 7-22, 1960)
Unclassified report

DESCRIPTORS: *Rotation, *Solids, *Dynamics, *Gyroscopes, Equations.

AD-297 749 Div. 25
(TISTW/RD) OTS price $6.60

Polytechnic Inst. of Brooklyn, N. Y.
COMPARISON OF ELASTICITY AND SHELL THEORY SOLUTIONS FOR A CIRCULAR CYLINDRICAL SHELL SUBJECTED TO PERIODICALLY SPACED BAND LOADS,
by Jerome M. Klosner and Richard Herman. Dec 62, 52p. illus. (PIBAL rept. no. 658)
(Contract Nonr-83917, Proj. NR 064-427)
Unclassified report

DESCRIPTORS: *Structural shells, *Elasticity, *Elastic shells, Shear stresses, Deformation, Stresses, Plasticity, Mathematical analysis, Theory, Loading.

AD-297 783 Div. 25
(TISTW/RD) OTS price $5.60

Cornell U., Ithaca, N. Y.
INFLUENCE OF LOCALIZED MODES ON THERMAL CONDUCTIVITY,
by Max Wagner. Jan 63, 50p.
Unclassified report

DESCRIPTORS: *Thermal conductivity, *Crystals, Crystal lattices, Relaxation time, Impurities, Alkali metal compounds, Halides, Mathematical analysis, Solid state physics, Symmetry (Crystallography), Crystal lattice defects, Phonons, Scattering.

AD-297 788 Div. 25, 20
(TISTP/JW) OTS price $4.60

Hughes Aircraft Co., Culver City, Calif.
RADIATION THROUGH CYLINDRICAL PLASMA SHEATHS,
by J. H. Harris. Aug 62, 45p. (Scientific rept. no. 2)
(Contract AF 19(604)8386, Proj. 4600)
(AFCRL 62-976) Unclassified report

DESCRIPTORS: *Plasma sheath, Cylindrical bodies, Narrowband, Radio waves, Propagation, Radiation effects.

AD-297 790 Div. 25, 30
(TISTP/WH) OTS price $6.60

Sperry Gyroscope Co., Great Neck, N. Y.
PROJECT LIGHTNING.
Quarterly progress rept. no. 1, 30 June-30 Sep 57.
30 Oct 57, 62p. (Rept. no. PX 617-1)
(Contract NObsr-72728)
Unclassified report

DESCRIPTORS: *Digital computers, Computer logic, Coding, Language, Programming (Computers), Electronic switches, Semiconductors, Superconductivity, Solid state physics, Design.

AD-297 799 Div. 25
(TISTP/TL) OTS price $3.60

Naples U. (Italy).
RENORMALIZATION GROUP AND COMPLETENESS OF FIELD THEORIES. NUCLEON-PION COUPLINGS,
by E. R. Caianiello and M. Marinaro. Aug 62, 28p. refs.
(Contracts DA 91-591-EUC-162 and AF 61(052)434)
Unclassified report

DESCRIPTORS: *Field theory, *Nucleons, *Pions, *Quantum mechanics, Matrix algebra, Combinatorial analysis, Differential equations, Transformations (Mathematics), Partial differential equations, Green's function, Mesons.

AD-297 801 Div. 25
(TISTM/BRW) OTS price $1.25

Texaco Experiment, Inc., Richmond, Va.
PREPARATION AND CHARACTERIZATION OF HIGH-PURITY SINGLE-CRYSTAL BORON.

Division 25 - PHYSICS

Final rept., 1 Mar 61-28 Feb 62 on Applied Research in Electrical, Electronic, and Magnetic Materials,
by Irving R. King, Gerald R. Taylor, Jr. and others. Jan 63, 41p.
(Contract AF 33(616)7884, Proj. 7371)
(ASD TDR 62-427) Unclassified report

DESCRIPTORS: *Single crystals, Preparation, Vapor plating, Zone melting, Electrical properties, Optical properties, X-ray diffraction analysis, Thermoelectricity, Photoconductivity, Crystal structure, Crystal growth, Infrared transmitters, Boron.

AD-297 825 Div. 25
(TISTM/EJH) OTS price $4.60

Westinghouse Electric Corp., Pittsburgh, Pa.
ELECTRON SPIN-LATTICE RELAXATION AT DEFECT SITES; E' CENTERS IN SYNTHETIC QUARTZ AT 3 KILOOERSTEDS,
by J. G. Castle, Jr., D. W. Feldman and others.
11 Oct 62, 46p. (Scientific rept. no. 1; Scientific paper no. 62-928-110-P1)
(Contract AF 19(628)1640, Proj. 4608)
(AFCRL 62-910) Unclassified report

DESCRIPTORS: *Quartz, *Paramagnetic materials, *Paramagnetic resonance, Single crystals, Crystal lattices, Spin, Electrons, Resonance, Relaxation time, Temperature, Impurities, Microwave spectroscopy, Resonance absorption, Magnetic properties.

AD-297 833 Div. 25
(TISTP/WH) OTS price $1.10

Hughes Aircraft Co., Culver City, Calif.
CESIUM PLASMA STUDIES FOR THERMIONIC ENERGY CONVERSION.
Quarterly letter rept. no. 3 on Phase 2, 1 June 61-31 May 63.
31 May 63, 4p.
(Contract Nonr-350100, Proj. 9800)
Unclassified report

DESCRIPTORS: *Plasma physics, *Resistance (Electrical), *Gas ionization, *Electrons, *Energy conversion, Cesium, Thermionic emission.

AD-297 842 Div. 25
(TISTA/FRL) OTS price $2.60

Mitre Corp., Bedford, Mass.
FURTHER STUDIES ON THE DIFFRACTION OF A PRESSURE WAVE BY AN ELASTICALLY LINED CYLINDRICAL CAVITY IN AN ELASTIC MEDIUM,
by M. L. Baron and R. Parnes. Sep 62, 10p. tables (Rept. no. SR-72)
(Contract AF 33(600)39852, Proj. 607)
(ESD TDR 63-207) Unclassified report

DESCRIPTORS: *Stiffened cylinders, *Cylindrical bodies, Shock (Mechanics), Stresses, Elasticity, Integral equations, Pressure, Shock waves, Structural shells.

AD-297 861 Div. 25
(TISTP/JW) OTS price $13.00

Stanford Research Inst., Menlo Park, Calif.
INVESTIGATION OF RESPONSE OF SIMPLIFIED ICBM-TYPE STRUCTURES TO IMPULSIVE LOADING,
by George R. Abrahamson. Dec 62, 178p.
(Contract AF 29(601)4329, Proj. 5776)
(AFSWC TDR 62-94, vol. 2)
Unclassified report

DESCRIPTORS: *Loading (Mechanics), Fatigue (Mechanics), Cylindrical bodies, Surfaces, Beams (Structural), Dynamics.

AD-297 883 Div. 25
(TISTP/WH) OTS price $4.60

Geophysics Corp. of America, Bedford, Mass.
SPECTRAL REFLECTIVITY OF THE EARTH'S ATMOSPHERE III: THE SCATTERING OF LIGHT BY ATOMIC SYSTEMS,
by A. Dalgarno. Dec 62, 37p. incl. illus. tables, 9 refs. (GCA technical rept. no. 62-28-A)
(Contract AF 33(657)9199)
Unclassified report

DESCRIPTORS: *Light, *Scattering, *Refractive index, Ultraviolet radiation, Hydrogen, Oxygen, Nitrogen, Molecules, Atoms.

The theory of the scattering of light by an atomic or molecular system shows that deviations from Rayleigh scattering must occur as the wavelength of the incident radiation decreases to that corresponding to the first resonance transition. An extrapolation procedure, based upon experimental refractive index data, is used to obtain scattering cross sections at wavelengths larger than the corresponding first resonance wavelengths for the inert gases and for molecular hydrogen, oxygen and nitrogen. The deviations from Rayleigh scattering are very large at ultraviolet wavelengths. A method is suggested for the direct calculation of scattering cross sections which is a generalization of a method used earlier by Dalgarno and Kingston to calculate the refractive index of atomic hydrogen. There is no satisfactory quantal theory of scattering near an absorption line and classical theory is employed to examine the possible behavior as the wavelength passes through an absorption line to shorter wavelengths. Numerical values are given for sodium, a case which should be susceptible to experimental investigation. (Author)

AD-297 884 Div. 25
(TISTP/WH) OTS price $9.10

Geophysics Corp. of America, Bedford, Mass.
SPECTRAL REFLECTIVITY OF THE EARTH'S ATMOSPHERE. II. A CONGERIES OF ABSORPTION CROSS SECTIONS FOR WAVELENGTHS LESS THAN 3000 ANGSTROMS,
by A. C. Holland, E. D. Schultz, and F. F. Marmo.
Dec 62, 97p. incl. illus. tables, 31 refs. (GCA technical rept. no. 62-27-A)
(Contracts AF 33(657)9199 and NASw-395)
Unclassified report

DESCRIPTORS: *Ultraviolet radiation, *Absorption, *Atmosphere, Planetary atmospheres, Tables, Solar radiation.

A compilation of experimental data is presented. To obtain this presentation, the literature was searched for current experimental data and reviews of investigations in this area. In a few cases, data were obtained through private communication with particular investigators. Available absorption curves and tabulations, in the spectral region from 100 A to 3000 A, of various authors were collected and identified. In each case where tabulated values of absorption coefficients or cross sections were available, plots

were constructed by connecting points with straight line segments. Where curves but not tabulations were available, the curves were reproduced either directly or by linearizing semi-log figures. (Author)

AD-297 947 Div. 25 U
(TISTP/MH) OTS price $2.60

Miami U., Coral Gables, Fla.
BROWNIAN MOTION AND ''RESONANCE DIFFUSION'' IN A MAGNETIC FIELD,
by Behram Kursunoglu. Aug 62, 20p.
(Contract AF 19(604)8082)
Unclassified report

DESCRIPTORS: *Plasma physics, *Resonance scattering, *Diffusion, *Friction, Magnetic fields, Relaxation time, Electrons, Ions, Dynamics.

AD-297 952 Div. 25, 17
(TISTM/EJH) OTS price $4.60

Ronson Metals Corp., Newark, N. J.
MATERIALS FOR AND THE MECHANISM OF GETTERING MULTIPLE COMPONENT GASES,
Final rept., 8 July-8 Sep 62,
by L. Epstein and L. J. Kaufman. 22 Jan 63, 36p. illus.
(Contract AF 19(604)8430, Proj. 4619)
(AFCRL 63-7) Unclassified report

DESCRIPTORS: *Degasification, *Low pressure research, Thorium alloys, Aluminum alloys, Cerium alloys, Titanium, Gases, Carbon dioxide, Nitrogen, Mass spectroscopy, Mathematical analysis, Pressure, Mixtures, Diffusion, High temperature research, Materials.

AD-297 967 Div. 25, 4
(TISTM/ODN) OTS price $1.60

Harvard U., Cambridge, Mass.
STRUCTURAL AND SYNTHETIC STUDIES ON TETRODOTOXIN.
Final rept., 15 Nov 60-14 Nov 61,
by R. B. Woodward. 14 Nov 61, 12p.
(Grant DA-CML-18-108-61-G-14)
Unclassified report

DESCRIPTORS: *Organic compounds, *Molecular structure, Infrared spectroscopy, Nuclear magnetic resonance, Chemical bonds, Solubility, Organic compounds (Others).

AD-297 973 Div. 25, 4
(TISTM/ODN) OTS price $11.00

Institute of Optics, U. of Rochester, N. Y.
LUMINESCENCE IN THE ALKALI HALIDES,
by K. Teegarden and Robert Frank Edgerton.
Jan 63, 135p. (Technical note no. 2)
(Grant DA AROD-31-124-679, Proj. 2045P)
(AROD rept. no. 2045:6)
Unclassified report

DESCRIPTORS: *Alkali metal compounds, *Potassium compounds, *Rubidium compounds, Iodides, Bromides, Chlorides, Thallium, Crystals, Emissivity, Absorption, Luminescence, Impurities, Excitation, Experimental data, Cryogenics, Halides.

AD-297 981 Div. 25
(TISTP/MH) OTS price $1.60

Aerospace Corp., Los Angeles, Calif.
TRANSMISSION THROUGH A PLASMA SHEATH IN THE PRESENCE OF A FLOATING DIELECTRIC SLAB,
by Keith M. Soo Hoo. 11 Jan 63, 17p. (Rept. no. TDR-169(3230-22)TN-2)
(Contract AF 04(695)169)
(SSD TDR 63-4) Unclassified report

DESCRIPTORS: *Plasma physics, *Plasma sheath, *Electromagnetic waves, Dielectric properties, Gas ionization, Wave transmission, Attenuation.

AD-297 984 Div. 25
(TISTP/JW) OTS price $1.60

Institute of Mathematical Sciences, New York U., N. Y.
FAR FIELD AMPLITUDES AND INVERSE DIFFRACTION THEORY,
by S. N. Karp. Sep 62, 17p. (Research rept. no. EM-179)
(Contract AF 19(604)5238, Proj. 5635)
(AFCRL 62-940) Unclassified report

DESCRIPTORS: *Electromagnetism, *Acoustics, Electromagnetic waves, Excitation, Amplitude modulation, Refraction.

AD-297 985 Div. 25, 4
(TISTM/RGR) OTS price $2.60

Stanford U., California.
THE MICROWAVE SPECTRUM, STRUCTURE, AND DIPOLE MOMENT OF CARBONYL FLUORIDE,
by Victor W. Laurie, Dallas T. Pence, and Robert H. Jackson. 1962, 11p. tables.
Unclassified report

DESCRIPTORS: *Organic compounds, Absorption spectrum, Microwaves, Chemical bonds, Molecular structure, Dipole Moments, Molecular spectroscopy.

AD-297 986 Div. 25, 4
(TISTM/RGR) OTS price $2.60

Mallinckrodt Chemical Lab., Harvard U., Cambridge, Mass.
FUNDAMENTAL VIBRATIONAL FREQUENCIES IN KETENE AND THE DEUTEROKETENES,
by A. Peter Cox and Alan S. Esbitt. 1959, 22p. illus.
Unclassified report

DESCRIPTORS: *Organic compounds, Thermodynamics, Absorption spectrum, Microwaves, Spectra (Infrared), Chemical bonds, Low-temperature research, Cryogenics, Infrared spectroscopy, Organic compounds (Others).

AD-297 987 Div. 25
(TISTM/EJH) OTS price $3.60

Copenhagen U. (Denmark).
AN IMPULSIVE COLLISION MODEL FOR THE DISSOCIATION OF DIATOMIC MOLECULES,
by Thor A. Bak and Joel L. Lebowitz. 1 Dec 62, 28p. illus. (Technical note no. 7)
(Contract AF 61(052)133)
(ARL 63-46) Unclassified report

DESCRIPTORS: *Dissociation, *Kinetic theory, *Gases, Molecules, Argon, Iodine, Quantum mechanics, Differential equations, Integral equations, Mathematical analysis.

Division 25 - PHYSICS

AD-297 990 Div. 25, 14, 16
(TISTM/EJH) OTS price $1.60

Aviation Medical Acceleration Lab., Naval Air Development Center, Johnsville, Pa.
FLAME CONTACT STUDIES. II. EXPERIMENTAL VALIDATION OF MATHEMATICAL ANALYSIS OF HEAT FLOW,
by Alice M. Stoll and Maria A. Chianta.
26 Dec 62, 13p. (Rept. no. NADC-MA-6216)
Unclassified report

DESCRIPTORS: *Thermal insulation, *Fire-resistant textiles, *Thermal conductivity, *Thermal diffusion, Heat transfer, Skin, Thermodynamics, Mathematical analysis, Flames.

AD-298 014 Div. 25
(TISTM/BRW) OTS price $2.60

Mechanical Technology Inc., Latham, N. Y.
EXPERIMENTAL INVESTIGATION OF SURFACE TEMPERATURE IN ROLLING-SLIDING CONTACTS,
by F. K. Orcutt. 31 Jan 63, 13p. illus. (Technical rept. no. 63TR3)
(Contract Nonr-372900)
Unclassified report

DESCRIPTORS: *Machines, *Lubrication, Surfaces, Gears, Cams, Roller bearings, Bearings, Temperature, Measurement, Test equipment, Friction, Films.

AD-298 044 Div. 25
(TISTM/EJH) OTS price $2.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
PREPARATION OF SILVER BROMIDE CRYSTALS,
by Homer L. Murray. Nov 62, 27p. (BRL memo. rept. no. 1441)
(DA Proj. 599-25-001)
Unclassified report

DESCRIPTORS: *Silver compounds, *Bromides, *Single crystals, *Crystal growth, Powders, Impurities, Electrical properties, Electrical conductance, Infrared spectroscopy, Laboratory furnaces, Manufacturing methods, Machining, Heat treatment, Chemical milling.

AD-298 063 Div. 25
(TISTA/FRL) OTS price $2.60

J. G. Engineering Research Associates, Baltimore, Md.
ELASTIC AND PLASTIC BEHAVIOR OF CYLINDRICAL SHELLS UNDER DYNAMIC LOADS BASED ON ENERGY CRITERIA,
by Joshua E. Greenspon. Feb 63, 18p. (Technical rept. no. 3)
(Contract DA 36-034-ORD-3081)
Unclassified report

DESCRIPTORS: *Cylindrical bodies, Deformation, Elasticity, Plasticity, Loading (Mechanics), Shear stresses, Energy, Integral equations, Theory, Structural shells.

AD-298 068 Div. 25, 17
(TISTM/ODN) OTS price $1.60

Naval Weapons Lab., Dahlgren, Va.
X-RAY DIFFRACTION STUDIES ON IRON AFTER EXPLOSIVE-SHOCKED LOADING,
by Thomas H. Dawson. 8 Mar 63, 10p. tables.
(NWL rept. no. 1845)
(NAVWEPS rept. no. 7681) Unclassified report

DESCRIPTORS: *Iron, High-pressure research, Stresses, Crystal lattice defects, Deformation, Hardness, Fourier analysis, Grain structures (Metallurgy), Cold-working, Shock (Mechanics), Hardening, Loading (Mechanics), X-ray diffraction analysis.

AD-298 107 Div. 25
(TISTP/WH/JVP) OTS price $3.60

Emmanuel Coll. Research Language Center, Boston, Mass.
A PHILOSOPHICAL ANALYSIS OF THE SPECIAL THEORY OF RELATIVITY.
Final rept.,
by L. Janossy (L. Yanoshi), tr. by Zanis Stuberovskis. June 62, 33p. (Trans. from Questions on Philosophy, no. 9, pp. 89-104, 1961)
(Contract AF 19(604)8505)
Unclassified report

DESCRIPTORS: *Relativity theory, *Mass energy relations, *Transformations (Mathematics), Electrons, Dynamics, Positrons.

AD-298 129 Div. 25, 17
(TISTM/AMS) OTS price $2.60

Case Inst. of Tech., Cleveland, Ohio.
MAGNETORESISTANCE AND HALL EFFECT IN SINGLE CRYSTALS OF ALUMINUM,
by R. W. Stark and T. G. Eck. Jan 63, 13p.
(Contract AF 49(638)621)
(AFOSR-951) Unclassified report

DESCRIPTORS: *Magnetic properties, *Single crystals, *Aluminum, Hall effect, Low temperature research, Magnetic fields, Electrical properties, Electric fields, Resistance (Electrical), Theory, Particle trajectories, Solid state physics, Surface properties, Crystals, Impurities.

AD-298 130 Div. 25
(TISTP/MB) OTS price $9.60

Army Electronics Research and Development Lab., Fort Monmouth, N. J.
SURVEY OF FREQUENCY SYNTHESIS TECHNIQUES,
by Milton Baltas. Sep 62, 115p. (USAELRDL tech. rept. no. 2271)
Unclassified report

DESCRIPTORS: *Oscillators, Synthesis, Frequency, Piezoelectric crystals, Crystal oscillators, Frequency analyzers, Frequency stabilizers, Frequency multipliers, Tuned circuits, Microwave generators, Microwaves, Stability, Reviews.

AD-298 134 Div. 25,
(TISTM/EJH) OTS price $2.60

Mechanical Technology Inc., Latham, N. Y.
ON FORWARD AND INVERSE ITERATION OF THE ELASTO-HYDRODYNAMIC PROBLEM,
by H. S. Cheng. 13 Dec 62, 23p. (Technical rept. no. MTI-62TR37)
(Contract Nonr-372900)
Unclassified report

DESCRIPTORS: *Lubrication, *Sliding contacts, *Deformation, Films, Lubricants, Temperature, Pressure, Roller bearings, Hydrodynamics, Elasticity, Mathematical analysis, Theory.

AD-298 143 Div. 25, 8
(TISTP/WH) OTS price $3.60

Space Sciences Inc., Natick, Mass.
NANOSECOND BREAKDOWN IN GASES.
Final rept.,
by J. M. Proud and P. Felsenthal. 15 Dec 62, 36p. incl. illus. 14 refs.
(Contract AF 30(602)2779, Proj. 4506)
(RADC TDR 62-617) Unclassified report

DESCRIPTORS: *Gas discharges, *Microwaves, *Video signals, *Diffusion, Electrons.

A six-month program to investigate nanosecond breakdown in gases demonstrated the utility and feasibility of a video pulse technique for obtaining data. It is shown analytically that conditions exist for which the same theory of breakdown is applicable to both microwave and video pulse breakdown. Results of preliminary experiments conducted in air at pressures down to about 4 mm Hg are in general accord with theory. Data were obtained for video pulses of 4.0 and 8.0 nanoseconds. (Author)

26. PRODUCTION AND MANAGEMENT

AD-297 022 Div. 26, 17
(TISTM/BRW) OTS price $3.60

Universal-Cyclops Steel Corp., Bridgeville, Pa.
TUNGSTEN SHEET ROLLING PROGRAM.
Interim technical progress rept. no. 6, 1 Sep-31 Jan 63,
by W. J. Schoenfeld. Feb 63, 25p. incl. illus. tables.
(Contract AF 33(600)41917, Proj. 7-827)
(ASC TR 7-827, vol. 6)
Unclassified report

DESCRIPTORS: *Tungsten, *Sheets, Melting, Electric arcs, Powder metals, Electrodes, Extrusion, Forging, Processing, Production.

The melting program was scaled up to provide 6-in. conditioned ingots for extrusion. Direct extrusion to sheet bar and extrusion to round for subsequent press forging to sheet bar was accomplished satisfactorily on four ingots. The round extrusions were forged to sheet bar and rolling was initiated. (Author)

AD-297 060 Div. 26
(TISTA/FRL) OTS price $2.60

Mechanical Technology, Inc., Latham, N. Y.
STATIC AND DYNAMIC FORCES OF PARTIAL ARC SELF-ACTING GAS JOURNAL BEARINGS AT MODERATE COMPRESSIBILITY NUMBERS,
by R. J. Wernick and C. H. T. Pan. Feb 63, 21p. incl. illus. table, 7 refs. (Rept. no. MTI-63TR4)
(Contract Nonr-3730(00)
Unclassified report

DESCRIPTORS: *Gas bearings, Lubricants, Compressive properties, Statics, Pressure, Mathematical prediction, Digital computers, Programming (Computers), Partial differential equations, Reynolds number, Journal bearings.

Vital design information consisting of both the static and time dependent fluid film forces are derived for partial arc gas journal bearings. The load carrying capacity of the bearings and the stability characteristics of the rotor-bearing system are determined. (Author)

AD-297 065 Div. 26, 30
(TISTE/OHD) OTS price $3.60

Mechanical Technology, Inc., Latham, N. Y.
EXPERIMENTAL INVESTIGATION OF TWO-PHASE FLOW IN THRUST BEARINGS,
by F. K. Orcutt. Jan 63, 21p. illus. 2 refs.
(Rept. no. MTI-62TR40)
(Contract Nonr-373100, Proj. NR 319-438)
Unclassified report

DESCRIPTORS: *Gas bearings, *Phase studies, Vapors, Test equipment, Test methods, Lubrication, Steam, Thrust bearings.

AD-297 094 Div. 26, 17
(TISTM/BRW) OTS price $1.10

Aeroprojects Inc., West Chester, Pa.
ULTRASONIC WELDING OF REFRACTORY METALS.
Progress rept. no. 8, 1 Apr-31 May 62.
19 July 62, 3p. illus.
(Contract NOw 61-0410-c)
Unclassified report

DESCRIPTORS: *Heat resistant metals and alloys, *Welding, Non-destructive testing, Shear stresses, Ultrasonic radiation.

The surface-wave inspection method, based on Lamb wave propagation, appears promising for detecting cracks and for evaluating the size of the bonded area. Further development work and extensive evaluation of this inspection technique would be required, however, to demonstrate the validity and practicality of this weld-inspection method. (Author)

AD-297 097 Div. 26
(TISTW/PCR) OTS price $3.60

Army Armor Board, Fort Knox, Ky.
SERVICE TEST OF CONTROLLER, DIFFERENTIAL PRESSURE, PIPELINE PUMP UNIT.
1 Feb 63, 34p. incl. illus.
(DA Proj. 8M53-03-001-06)
Unclassified report

DESCRIPTORS: *Pressure regulators, *Control systems, Tests, Test methods, Training, Safety, Maintenance, Reliability, Photographs, Hydraulic systems, Hydraulic pressure pumps.

AD-297 098 Div. 26
(TISTB/LH) OTS price $19.75

Ballistic Systems Div., Norton Air Force Base, Calif.
ANALYSIS OF RELIABILITY MANAGEMENT IN DEFENSE INDUSTRIES,
by Vincent J. Bracha. June 62, 1v. incl. illus. tables, refs. (Rept. no. BSD TDR 62-48)
Unclassified report

DESCRIPTORS: *Industries, *Management engineering, Operations research, Quality control, Costs, National defense, Research program administration, Mathematical analysis, Probability, Military requirements.

Guidelines have been developed in analyzing the reliability function in industry and valid conclusions have been derived. These can be summarized as: (1) reliability, as a distinct functional organization, has been embraced by the greater part of the defense industry, (2) the reliability organization is gradually moving up in company structural organizations, (3) to be most effective, a company's reliability group should report to top management in both a line and staff capacity, (4) the reliability function is an over-all control function embodying the total concept and cutting across departmental lines, and (5) inadequate funds, plus compressed time schedules are currently the biggest deterrent to increased reliability. Coupled with this is the lack of management understanding, emphasis, and recognition of the reliability scope. Management's reliability policies, objectives and responsibilities have been delineated, the relationship of reliability to quality control has been described and reliability tasks have been detailed. (Author)

AD-297 320 Div. 26, 14
(TISTM/ODN) OTS price $1.60

General Dynamics/Convair, San Diego, Calif.
TITANIUM ANTI-GALLING TREATMENT FOR THREADED ASSEMBLY.
Report on Materials - Finishes and Coatings - Anti-Galling - For Titanium Fasteners. Seizure Characteristics,
by R. R. Reschan, E. E. Keller, and W. M. Sutherland. 22 Dec 58, 9p. illus. tables, 1 ref. (Rept. no. 8926-087)
(Contract AF 33(657)8926)
Unclassified report

DESCRIPTORS: *Bolts, *Locking fastener devices, *Antiseize compounds, Titanium alloys, Phosphate coatings, Coatings, Epoxy plastics, Plastic coatings, Heat treatment, Molybdenum compounds, Sulfides, Nickel, Plating, Metal coatings, Silver, Torque, Protective treatments, Friction.

The number of turns required to cause 1/2 inch hexagonal Ti 6Al-4V nuts to seize on 1/2 x 3 inch, MS 20008-43 type, Ti 4Al-4Mn bolts under a tension (axial) load applied to a nut and bolt assembly was used as a comparison criterion. Uncoated, fluoride-phosphate, Ti-Oxide anodic treated, Hardaz anodic treated, Electrofilm 66C (baked epoxy resin - molybdenum disulfide finish), silver- and nickel-plated, and heat treated (1000 F, 4 hours in air, air cool) nuts were treated. Test results showed that nuts which were silver-plated or electrofilm-coated were about equal to each other and superior to the other surface treatments in resisting galling. The anodic treatments used had the greatest tendency for seizure, in some cases than that of the bare nuts used as a standard of comparison. (Author)

AD-297 325 Div. 26, 17
(TISTM/BRW) OTS price $1.60

General Dynamics/Convair, San Diego, Calif.
EVALUATION TEST OF 1/8'' SMITHWAY SW-151 ELECTRODES. MODEL F-106A.
Report on Material - Welding Electrodes - Metal Arc - Smithway SW-151 (A. O. Smith Corporation). Weld Strength and Ductility After Heat Treatment,
by T. J. Koppenal, H. C. Turner, and W. M. Sutherland. 10 June 57, 10p. illus. tables, 1 ref. (Rept. no. 8926-095)
(Contract AF 33(657)8926)
Unclassified report

DESCRIPTORS: *Welding, *Steel, Heat treatment, Mechanical properties, Hardness, Tensile properties, Shear stresses, Electrodes, Welds.

SAE 4130 steel plates 1/4-, 3/8- and 1/2-in.-thick were double V chamfered with 1/16-in. lands on the edges to be welded. SAE 4130 steel plates 1/8-in.-thick were squared preparatory to welding. The steel plates were welded with 1/8-in.-diam Smithway 151 (A. O. Smith Corporation, Milwaukee, Wisconsin), as follows: 1/8- and 1/4-in.-thick, two passes, one from each side; 3/8- and 1/2-in.-thick, four passes, two from each side. After welding, all test specimens were heat treated as follows: 1600 F one hour, oil quench, 830 or 1000 F one hour, air cool. Tension, bend and shear testing subsequent to heat treatment showed the welds capable of developing satisfactory strengths in 150,000 psi (830 F temper) and 175,000 psi (1000 F temper) ranges. Those welds heat treated to the 150,000 psi range displayed satisfactory ductility, but those heat treated to the 175,000 psi range appeared to be somewhat brittle. (Author)

AD-297 334 Div. 26, 17
(TISTM/BRW) OTS price $3.60

General Dynamics/Convair, San Diego, Calif.
A STUDY OF THE JOINING OF METALS BY THE DECOMPOSITION OF SOME ORGANOMETALLIC COMPOUNDS.
Report on Materials - Finishes and Coatings - Vapor Deposited Nickel, Iron, Chromium, Molybdenum - For Joining Stainless Steel and Titanium Alloy. Plating and Joining Characteristics,
by F. M. Graber, T. D'Annessa, and V. Ianucci. 20 Jan 59, 28p. incl. illus. table, 43 refs.
(Rept. no. 8926-088)
(Contract AF 33(657)8926)
Unclassified report

DESCRIPTORS: *Metals, *Stainless steel, *Titanium alloys, Aluminum alloys, Vanadium alloys, Metalorganic compounds, Decomposition, Vapor plating, Welds, Honeycomb cores, Sandwich construction, Thermal joining, Coatings.

Study of the joining of metals (in the form of a tee joint) by decomposition of organometallic compounds yielded information relative to the major problems involved. Inability to form a fillet and lack of throwing power appeared as major problems. Deposited coatings thinned near the tee joint and resulted in joints with low strength and little practical value. Vapor plating of nickel and iron resulted in ductile adherent coatings on Armco 17-7 PH stainless steel and Ti 6Al-4V alloy. Vapor plating of chromium and molybdenum produced adherent but brittle coatings. Experiments on the joining of metals and honeycomb sandwich by vapor plating and resistance welding indicate merit in this approach. (Author)

AD-297 357 Div. 26, 17
(TISTM/BRW) OTS price $1.10

Aerospace Information Div., Washington, D. C.
LOCALIZED DIE FORGING OF ALUMINUM PANELS.
30 Jan 63, 3p. incl. illus. (AID rept. no. S-63-19; Trans. from Manufacturing of Panels by a Method of Localized Die Forging. Kuznechno-Shtampovochnoye Proizvodstvo, No. 11, pp. 1-5, 1962.
Unclassified report

DESCRIPTORS: *Aluminum alloys, *Dies, Hot working, Manufacturing methods, Panels (Structural), Forging.

A new method - localized die forging - is suggested for the manufacture of ribbed panels. In localized die forging, the entire panel is forged at one time, but unlike conventional forging, forging pressure is concentrated (localized) in areas that are more difficult to shape than the rest of the panel. Better conditions are thus created for shaping panel sections with high thin ribs. The new method also differs from sectional die forging, in which a panel is forged in succeeding sections in order to reduce the required press capacity. (Author)

AD-297 445 Div. 26
(TISTB/MS) OTS price $3.60

System Development Corp., Santa Monica, Calif.
THE USE OF SIMULATION IN MANAGEMENT ANALYSIS. A SURVEY AND BIBLIOGRAPHY,
by D. G. Malcolm. 24 July 59, 31p. incl. tables, refs. (Rept. no. SP-88)
Unclassified report

Presented at the 1958 Annual Meeting of the American Society of Mechanical Engineers, 30 Nov-5 Dec 58, New York.

DESCRIPTORS: *Simulation, *Commerce, *Operations research, *Management engineering, *Bibliographies, Industrial research, Military research, Games theory, Control, Decision making.

Computer simulation, or system simulation, is being used in research and design for seeking a better understanding and control of business operations. Three concurrent developments account for the emergence of simulation as a management analysis method: the need for more detailed and accurate analyses in the competitive business world, the development of new engineering analysis methods, and the availability of high-speed electronic computers. Typical simulation projects directed to the following objectives are discussed: systems design and evaluation, systems research and planning, and training (both appreciation and procedural). In the ideas involved lie the possibility for a new management control concept. It seems likely that management may someday be provided with a computer model of the business -- one permitting experimentation with policy and procedure changes as well as evaluation of alternative plans. A bibliography of publications of simulation, gaming is included. (Author)

AD-297 452 Div. 26
(TISTB/AW) OTS price $1.10

System Development Corp., Santa Monica, Calif.
SYSTEM TROUBLE-SHOOTING,
by H. M. Parsons. 2 July 62, 8p. 17 refs.
(Rept. no. SP-793)
Unclassified report

DESCRIPTORS: *Operations research, Reliability, Errors, Identification, Electronic countermeasures, Man, Command and control systems.

AD-297 526 Div. 26, 17
(TISTM/BRW) OTS price $5.60

Aeroelastic and Structures Research Lab., Mass. Inst. of Tech., Cambridge.
PLASTIC DEFORMATION OF THIN BRAZED JOINTS IN SHEAR,
by C. W. Shaw, L. A. Shepard and J. Wulff.
Nov 62, 45p. (Rept. no. ASRL TR 94-3)
(Contract AF 49(638)775, Proj. 9782)
Unclassified report

DESCRIPTORS: *Steel, *Soldered joints, Plasticity, Creep, Silver, Silver solders, Shear stresses, Brazing, Deformation.

AD-297 542 Div. 26
(TISTM/BRW) OTS price $8.60

Westinghouse Electric Corp., Blairsville, Pa.
HIGH ENERGY RATE EXTRUSION PROGRAM.
Interim technical progress rept. no. 9 on Phase 2, 1 Nov 62-31 Jan 63,
by J. M. Rippel. Feb 63, 80p. incl. illus. tables.
(Contract AF 33(600)41948)
(ASD TR 7-882, vol. 9) Unclassified report

DESCRIPTORS: *Machine tools, *Titanium alloys, *Steel, *Stainless steel, Pneumatic systems, Hydraulic systems, Aluminum alloys, Vanadium alloys, Airframes, Material forming, Extrusion, Explosive forming.

Ten foot lengths of Ti-6Al-4V, 304 stainless steel, and AISI 4340 steel were obtained, however, good quality steel extrusions with very uniform cross sections have been consistently made only in 8 feet lengths. A process was developed for straightening these extrusions. This work was done on equipment modified for straightening titanium alloy extrusions. Further development of braking devices was accomplished. In the present state of development the braking device is useful in obtaining extrusions up to 30% longer but is not capable of producing unlimited lengths. Examination of the mechanical properties of the extrusions revealed that the properties are equivalent to those characteristic of each type of material in a variety of wrought forms. There has been no significant altering of the typical properties of these materials as a result of the high-velocity extrusion operation. (Author)

AD-297 800 Div. 26, 30, 15
(TISIP/MS) OTS price $2.00

Armed Services Technical Information Agency, Arlington, Va.
PERT (PROGRAM EVALUATION REVIEW TECHNIQUE) AN ASTIA REPORT BIBLIOGRAPHY.
Bibliography for Oct 58-Feb 63,
comp. by Elizabethe H. Hall. 13 Mar 63, 1v. 386 refs.
Unclassified report

DESCRIPTORS: *Research program administration, *Management engineering, *Bibliographies, Cost, Control, Logistics, Time, Reviews, Scheduling, Control systems.

A compilation of abstracts pertaining to unclassified, unlimited reports in the ASTIA collection and to open literature were prepared in response to numerous inquiries concerning PERT (Program Evaluation and Review Technique) and to certain PERT modifications. Reports available from ASTIA are identified as AD documents and were selected from the AD collection covering the period from October 1958 through February 1963.

AD-297 837 Div. 26
(TISTA/LSK) OTS price $5.60

Air Force Cambridge Research Labs., Bedford, Mass.
MONTHLY MAINTENANCE SUMMARY FOR JANUARY 1963.
31 Jan 63, 49p. (Rept. no. RCS-AFSC-K-10)
Unclassified report

DESCRIPTORS: *Maintenance, Tables, Personnel management.

AD-297 882 Div. 26, 25
(TISTM/ODN) OTS price $15.50

Battelle Memorial Inst., Columbus, Ohio.
FATIGUE INVESTIGATION ON PIN-JOINED LUG CONNECTIONS.
Technical rept., Sep 59-May 61 on Rotor Blade Fatigue,
by Alexander A. Mittenbergs, Leman G. Beall, Jr., and Horace J. Grover. 15 June 61, 220p. incl. illus. tables.
(Contract AF 33(616)6751, Proj. 3137; Continuation of Contract AF 33(616)3799)
(ASD TR 61-163) Unclassified report

DESCRIPTORS: *Joints, *Mechanical fasteners, Fatigue (Mechanics), Steel, Aluminum, Torque, Deformation, Pins (Mechanical), Tests, Experimental data, Failure (Mechanics), Test equipment, Fracture (Mechanics), Stresses, Loading (Mechanics), Geometric forms, Moments, Tables.

The effects of geometric parameters on the fatigue strength of pin-loaded lug-joints were investigated. Exploratory-type investigations with steel specimens were conducted on the effects of high pin interference and on shear joints. All test specimens were subjected to a steady tension load, simulating the centrifugal force in a helicopter blade-retention fitting, and an alternating bending moment, simulating the flapwise or chordwise bending. The experimental results were evaluated in terms of moment-carrying capacity per unit weight of the specimens. Steel specimens had higher strength/weight ratios than aluminum specimens. High pin interferences improved the fatigue strength of pin-loaded lug joints. A properly torqued-up shear joint was superior to a similar pin-loaded lug joint with a small pin interference. The fatigue strength of a shear joint decreased with the clamping force.

AD-298 069 Div. 26, 30, 15
(TISTB/AW) OTS price $2.60

RAND Corp., Santa Monica, Calif.
USES OF MONTE CARLO IN PERT,
by Richard Van Slyke. Feb 63, 23p. (Memo. no. RM-3367-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Management engineering, *Operations research, Programming (Computers), Sampling, Monte Carlo method, Numerical methods and procedures.

AD-298 075 Div. 26
(TISTB/MS) OTS price $14.00

RAND Corp., Santa Monica, Calif.
NETWORK-TYPE MANAGEMENT CONTROL SYSTEMS BIBLIOGRAPHY,
by B. L. Fry. Feb 63, 199p. (Memo. no RM-3074-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Control systems, *Bibliography, Computers, Logistics, Programming (Computers), Operations research, Scheduling, Management engineering.

27. PROPULSION SYSTEMS

AD-297 082 Div. 27
(TISTA/FRL) OTS price $3.60

Army Armor Board, Fort Knox, Ky.
REPORT OF SERVICE TEST OF MILITARY STANDARD GASOLINE ENGINES 6 HORSEPOWER MODEL 4A032-1, 10 HORSEPOWER MODEL 2A042-1, AND 20 HORSEPOWER MODEL 4A084-1.
1 Feb 63, 27p. incl. illus.
(DA Proj. 8M49-13-001-02)
Unclassified report

DESCRIPTORS: *Internal combustion engines, Military requirements, Tests, Operations, Training, Human engineering, Transportation, Engine structures, Maintenance, Acceptability, Gasoline.

The following tests were conducted on gasoline engines: familiarization and training, operation, maintenance and ease of repairs, and transportability. (Author)

AD-297 395 Div. 27
(TISTA/LSK) OTS price $2.60

Naval Ordnance Test Station, China Lake, Calif.
FEASIBILITY STUDY AND DEMONSTRATION OF VARIABLE-THRUST PROPULSION FOR A SOFT-LANDING VEHICLE,
by Felton Williamson, Jr. Jan 63, 26p. incl. illus. (NOTS TP 2901)
(NAVWEPS rept. no. 7900)
Unclassified report

DESCRIPTORS: *Lunar probes, *Retro rockets, *Rocket motors (Liquid propellant), *Thrust, Rocket motor nozzles, Jet pumps, Bipropellants, Hovering, Nitric acid, Feasibility studies, Landings, Control.

The soft-landing vehicle was designed and tested to demonstrate the feasibility of using the NOTS Variable Area Injector to softly land a rocket vehicle without the aid of aerodynamic forces. The vehicle was tested in a ''vertical track'' which restricted freedom of movement to the direction of the vertical axis. Propellant tank capacity of the soft-landing vehicle was 200 pounds of inhibited red fuming nitric acid and 100 pounds of unsymmetrical-dimethylhydrazine. Total loaded weight of the vehicle was 700 pounds and maximum thrust was 1,300 pounds. The vehicle successfully completed four captive flight tests. During these tests a maximum height of 155 feet and landing velocities between 3.8 and 8.3 feet per second were achieved. Thrust control was sufficient to allow the observer to hover the vehicle. (Author)

AD-297 500 Div. 27
(TISTA/GEC) OTS price $8.10

Allison Div., General Motors Corp., Indianapolis, Ind.
ADVANCED REGENERATOR COMPONENT TEST PROGRAM.

Final technical rept., 1 Feb 62-3 Jan 63. 5 Feb 63, 80p. (Rept. no. 3201)
(Contract NOw 62-0616-d)
Unclassified report

DESCRIPTORS: *Turbopropeller jet engines, Fuel consumption, Heat transfer, Antisubmarine aircraft, Tests, Configuration, Honeycomb cores, Heat exchangers, Design.

AD-297 828 Div. 27
(TISTW/RD) OTS price $3.60

Naval Ordnance Test Station, China Lake, Calif.
SECONDARY INJECTION ROLL CONTROL INVESTIGATIONS.
Final rept.,
by Richard D. Fulmer. Feb 63, 32p. (NOTS TP 3147)
(NAVWEPS rept. no. 8094) Unclassified report

DESCRIPTORS: *Thrust vector control systems, *Rocket motor nozzles, *Guided missiles, *Attitude control systems, Pitch (Motion), Nitrogen, Yaw, Control, Secondary injection.

AD-297 932 Div. 27, 1
(TISTA/LSK) OTS price $5.60

General Electric Co., Cincinnati, Ohio.
ANALYSIS AND TEST RESULTS OF DIVISION OF POWER BETWEEN LIFT FAN AND JET NOZZLE.
Dec 62, 54p.
(Contract DA 44-177-tc-584)
(TCREC TR 62-80) Unclassified report

DESCRIPTORS: *Vertical take-off planes, Plug nozzles, Flaps, Jet fighters, Take-off, Moments, Thrust, Deflection, Maneuverability, Flight paths, Control systems, Ducted fans, Turbojet engines, Turbojet exhaust nozzles.

AD-297 991 Div. 27, 22
(TISTA/LSK) OTS price $1.10

Naval Ordnance Lab., White Oak, Md.
GUIDED MISSILE PROPULSION SYSTEM HAZARDS OF ELECTROMAGNETIC RADIATION TO ORDNANCE (HERO) RF CHARACTERISTICS OF ELECTRO-EXPLOSIVE DEVICES.
Quarterly progress rept., 1 Oct-31 Dec 62.
31 Dec 62, 5p. tables.
Unclassified report

DESCRIPTORS: *Electric igniters, *Rocket igniters, *Electromagnetic waves, Radiofrequency, Explosive actuators, Hazards.

AD-298 089 Div. 27, 17
(TISTM/BRW) OTS price $1.10

Armour Research Foundation, Chicago, Ill.
DEVELOPMENT AND APPLICATION OF A THEORY FOR PLASTIC DEFORMATION OF CEMENTED ALLOYS.
Quarterly rept., 1 Apr-30 June 62 on Copper-Cooled Tungsten Fiber Rocket Nozzle Materials,
by N. M. Parikh. 25 July 62, 8p. (Tech. rept. no. WAL TR 372/32-5, T3)
(Contract DA 11-022-505-ORD-3092, Proj. 5B93-32-002)
Unclassified report

DESCRIPTORS: *Rocket motor nozzles, *Metallic textiles, Copper, Impregnation, Cooling, Powder metals, Silver alloys, Copper alloys, Materials, Tungsten alloys.

AD-298 135 Div. 27, 30
(TISTA/LSK) OTS price $8.10

Picatinny Arsenal, Dover, N. J.
OPTICAL-MECHANICAL INSPECTION FOR ROCKET MOTORS,
by George Haddad. Oct 62, 76p. incl. illus.
(Technical rept. no. 3015)
Unclassified report

DESCRIPTORS: *Rocket motors (Solid propellant), *Jatos, Test equipment, Optical equipment, Collimators, Mirrors, Telescopes, Jigs, Test methods.

The development and application of optical-mechanical inspection techniques is covered for the following rocket motors: (1) Rocket Motor, (JATO), Matador, XM13; (2) Rocket Motor, Drone, T252; and (3) Rocket Motors, Improved Honest John, XM31E2. The development of subject inspection was based on the optical line-of-sight principle. The main elements are the jig alignment telescope with auto-collimation unit, alignment targets, optical flat mirror, and the various mechanical mounts and adaptors for the optical equipment. Measuring devices such as micrometers, height gage, test set indicator, and measuring blocks are also required. (Author)

28. PSYCHOLOGY AND HUMAN ENGINEERING

AD-297 062 Div. 28
(TISTB/LMH) OTS price $3.60

Hawaii U., Honolulu.
STRATEGY IN A MASCULINE QUIZ GAME,
by W. Edgar Vinacke and Susan Stanley. 9 Nov 62, 35p. incl. tables, 6 refs. (Technical rept. no. 2)
(Contract Nonr-374802, Proj. NR 170-270)
Unclassified report

DESCRIPTORS: *Group dynamics, *Projective techniques, Recreation, Behavior, Analysis of variance, Sex, Women, Man, Reaction (Psychology), Game theory.

AD-297 343 Div. 28
(TISTB/MS) OTS price $1.10

Behavioral Sciences Lab., Aerospace Medical Div., Wright-Patterson Air Force Base, Ohio.
WALKING UNDER ZERO-GRAVITY CONDITIONS USING VELCRO MATERIAL,
by Earl D. Sharp and Charles W. Sears. Jan 63, 6p. incl. illus. (AMRL memo. P-23)
Unclassified report

DESCRIPTORS: *Human engineering, *Weightlessness, *Adhesives, Nylon, Design, Maneuverability, Textiles.

Velcro material applied to a maximum area, flexible shoe with a resilient, flat sole appears to hold some promise as an aid to 'weightless walking'. Under the conditions of this study, the body posture that permitted the most successful walking gait was a crouched position, knees bent and the upper portion of the body bent forward. This posture apparently best enables the center of mass of the body to maintain a straight line path parallel to the walking

surface. Subject-induced motions appear to play a definite part in attaining a good walking gait. Swinging the arms, the velocity with which the legs are raised off the floor, and the technique that is used in separating the Velcro material on the shoes from that on the walkway all play a part in the success or failure of maintaining useful contact with the walking surface. (Author)

AD-297 413 Div. 28
(TISTB/AW) OTS price $5.60

Philco Corp., Palo Alto, Calif.
MSAP - PHASE A HUMAN ENGINEERING PLAN.
28 Feb 63, 1v. incl. illus. table (Rept. no. WDL-TR2026)
(Contracts AF 04(695)278 and AF 04(695)113)
Unclassified report

DESCRIPTORS: *Command and control systems, *Human engineering, Display systems, Satellites (Artificial), Satellite networks, Analysis, Ground support equipment.

AD-297 416 Div. 28
(TISTE/OHD) OTS price $10.10

Philco Corp., Palo Alto, Calif.
HUMAN FACTORS ENGINEERING SPECIAL PROGRAMS AND PROGRAM 461.
Final rept.
11 Feb 63, 124p. incl. illus. tables (Rept. no. WDL-TR2007)
(Contract AF 04(695)113)
Unclassified report

DESCRIPTORS: *Human engineering, Display systems, Control panels, Acceptability, Ground support equipment, Instrumentation, Decision making, Feasibility studies.

The human factors engineering effort for 1962 on special programs and Program 461 is summarized. Significant tasks performed during the year include operability evaluations of station activities, control display designs, intracommunication network analyses, and layouts of work spaces. (Author)

AD-297 432 Div. 28
(TISTB/AW) OTS price $11.00

Stanford Research Inst., Menlo Park, Calif.
THE KNOWLEDGEABLE ANALYST: AN APPROACH TO STRUCTURING MAN-MACHINE SYSTEMS,
by K. H. Schaeffer, John B. Fink and others.
Feb 63, 132p. incl. illus. tables, refs.
(Contract AF 49(638)1020)
(AFOSR-4490) Unclassified report

DESCRIPTORS: *Operations research, Management engineering, Reliability, Analysis, Models (Simulation), Decision making, Reasoning, Effectiveness.

The objectives of systems analysis are to analyze specific systems in order to solve predesignated problems. These objectives are at variance with those of the empirical sciences, which attempt to discover general laws. Since the two objectives differ, the method of systems analysis differs from the method of science. In an attempt to evolve a general method for systems analysis, the matrix-network approach for the analysis of complex man-machine systems is presented. This approach consists of seven steps which show how a system can be structured and how mathematical models of systems aspects can be incorporated into the over-all analysis. However, some of these steps involve, besides formal rules, the judgment of a knowledgeable analyst. To delve deeper into this judgment function, various logical, methodological, and psychological aspects concerning this function are discussed by different authors. On the basis of these discussions the principal author develops requirements which must be met by successful approaches to the structuring of complex systems. (Author)

AD-297 502 Div. 28
(TISTB/AW) OTS price $3.60

Philco Corp., Palo Alto, Calif.
PROGRAM 823. HUMAN ENGINEERING PLAN.
Technical operating rept.
28 Feb 63, 1v. (Rept. no. WDL-TR2016)
(Contract AF 04(695)113)
Unclassified report

DESCRIPTORS: *Human engineering, Control systems, Satellites (Artificial), Display systems.

AD-297 518 Div. 28, 16
(TISTB/AW) OTS price $1.10

Primate Lab., U. of Wisconsin, Madison.
MEASUREMENT OF DETRIMENTAL DRUG EFFECTS ON COMPLEX BEHAVIOR IN ANIMALS.
Annual progress rept. no. 2, Oct 61-Oct 62,
by V. J. Polidora and H. F. Harlow. 1 Oct 62, 2p.
(Grant DA-CML-18-108-G-34)
Unclassified report

DESCRIPTORS: *Non-lethal agents, *CNS depressants, Test methods, Instrumentation, Behavior, Attention.

AD-297 748 Div. 28, 16
(TISTB/CCH) OTS price $1.60

Air Crew Equipment Lab., Naval Air Material Center, Philadelphia, Pa.
DETERMINATION OF TEST INSTRUMENTATION REQUIREMENTS FOR BIOLOGICAL AIRBORNE AND ASTRONAUTICAL TESTS. THE PSYCHOMOTOR TASK AS A MONITOR OF SUBJECT SAFETY,
by R. L. Burdick. 30 July 62, 15p. (Rept. no. NAMC-ACEL-486)
Unclassified report

DESCRIPTORS: *Psychomotor tests, Safety, Warning systems, Performance tests, Safety devices.

AD-297 908 Div. 28
(TISTB/AW) OTS price $3.60

Philco Corp., Palo Alto, Calif.
HUMAN ENGINEERING EVALUATION OF MAJOR OPERATING POSITIONS AT NHS AND VTS FOR SUPPORT OF PROGRAM 461.
Technical operating rept.
1 Mar 63, 30p. (Rept. no. WDL-TR2009)
(Contract AF 04(695)113)
Unclassified report

DESCRIPTORS: *Human engineering, *Control panels, Operators (Personnel), Tracking, Display systems, Labels, Indicator lights.

AD-297 963 Div. 28
(TISTB/AW) OTS price $1.60

Harvard U., Cambridge, Mass.
(No title).
Progress rept. no. 40, 1 June-31 Dec 62.
31 Dec 62, 15p. (Rept. no. PPM-101)
(Grants G-10716 and B-2974)
Unclassified report

DESCRIPTORS: *Perception, *Psychology, Brightness, Pitch discrimination, Psychoacoustics, Taste, Thresholds (Physiology), Heat, Adaptation (Physiology), Hearing.

AD-297 970 Div. 28
(TISTB/AW) OTS price $7.60

Rutgers U., New Brunswick, N. J.
HOMEOSTASIS THEORY OF SMALL GROUPS VIII: LONGITUDINAL STUDY,
by Bernard P. Indik and John Tyler. Jan 63, 72p. (Technical rept. no. 11)
(Contract Nonr-40410)
Unclassified report

DESCRIPTORS: *Group dynamics, Social communication, Adjustment (Psychology), Projective techniques, Women.

AD-298 132 Div. 28
(TISTB/SAT) OTS price $2.60

National Training Labs., Washington, D. C.
FACTORS PRODUCING DEFENSIVE BEHAVIOR WITHIN GROUPS.
Final rept., 1 Feb 60-31 Dec 62,
by Jack R. Gibb. 31 Dec 62, 29p.
(Contract Nonr-308800)
Unclassified report

DESCRIPTORS: *Group dynamics, Social communications, Theory, Control, Motivation, Decision making, Behavior.

29. QUARTERMASTER EQUIPMENT AND SUPPLIES

AD-298 010 Div. 29, 14
(TISTM/ODN) OTS price $1.10

Army Prosthetics Research Lab., Walter Reed Army Medical Center, Washington, D. C.
FABRICATION OF AN IMPROVED ACRYLATE COSMETIC GLOVE COMPOSITE,
by Allen Winer. Feb 63, 7p. (Technical rept. no. 6303)
(Proj. 6X59-01-001-04)
Unclassified report

DESCRIPTORS: *Gloves, *Acrylic resins, Manufacturing methods, Colors, Elastomers, Materials.

30. RESEARCH AND RESEARCH EQUIPMENT

AD-297 072 Div. 30, 15
(TISTP/JW) OTS price $2.60

RAND Corp., Santa Monica, Calif.
GRAPH THEORY AND AUTOMATIC CONTROL,
by Robert Kalaba. Feb 63, 24p. 24 refs.
(Paper no. P-2704)
Unclassified report

DESCRIPTORS: *Control systems, *Research program administration, Mathematical analysis, Computer logic, Numerical analysis, Theory, Tables.

Several important classes of problems in the theory of automatic control--including time-optimal control--find a natural setting in the field of graph theory. Various aspects of formulation, analytical and numerical treatment, and implementation are sketched. (Author)

AD-297 104 Div. 30
(TISTP/WH) OTS price $1.60

Army Missile Command, Redstone Arsenal, Huntsville, Ala.
LOGIC AND CIRCUIT CONSIDERATIONS IN THE DESIGN OF A DIGITAL DIFFERENTIAL ANALYZER TO BE USED AS A TEST TOOL FOR EVALUATION OF ADVANCED MEMORY DEVICES,
by John R. Williams. 16 Jan 63, 15p. incl. illus. (Rept. no. RG-TR-63-8)
(Proj. 516-01-004)
Unclassified report

DESCRIPTORS: *Digital computers, *Analog to digital converters, *Computer logic, Circuits, Design.

The technical design and problems encountered in the building of a Digital Differential Analyzer (DDA), a test tool for evaluation of advanced memory devices, digital to analog and analog to digital converters are presented. The first step in building the test tool was to select a particular guidance scheme to mechanize. The Pershing Missile Guidance was instrumented for this purpose. In order to simplify the building of the DDA commercial digital modules were used as the basic components. The logical design, construction and testing of all the circuits were completed, and all units operated satisfactorily. In order to make accuracy tests with actual acceleration profiles it was necessary to construct a device to serve as a buffer between the DDA and a general purpose digital machine which would provide the proper input data. (Author)

AD-297 122 Div. 30, 31
(TISTE/JBM) OTS price $2.60

David Taylor Model Basin, Washington, D. C.
THE HIGH-SPEED BASIN AND INSTRUMENTATION AT THE DAVID TAYLOR MODEL BASIN,
by K. E. Schoenherr and W. F. Brownell. Jan 63, 27p. incl. illus. table, 10 refs. (Rept. no. 1660)
Unclassified report

Paper presented at the 17th Annual American Rocket Society Meeting, 13 Nov 62, at Los Angeles, Calif.

Division 30 - RESEARCH AND RESEARCH EQUIPMENT

DESCRIPTORS: *Model basins, *Test facilities, *Dynamometers, Model tests, Ship models, Simulation, Underwater propulsion, Torpedo models, Surface propulsion, Propellers (Marine), Hydrofoils, Hydrodynamics, Planing surfaces, Hydrodynamic configurations, Sonar domes, Instrumentation.

The 2968-ft high-speed model basin and several instrumentation systems used for testing a wide variety of models such as full-scale torpedoes towed and self-propelled, hydrofoils, planing boats, pumpjets, propellers, and other high-speed vehicles are described. Information concerning the basin; towing carriages; and propulsion, force, and speed measuring instrumentation is presented. Typical test procedures and usage of the carriages are discussed. New instrumentation nearing completion, which will greatly extend the high-speed basin testing capabilities, is described. (Author)

AD-297 279 Div. 30, 32
(TISTB/MS) OTS price $1.10

Thomas J. Watson Research Center, Yorktown Heights, N. Y.
AN APPLIED RESEARCH PROGRAM OF INTELLIGENCE DATA HANDLING.
Quarterly rept. no. 1, 1 May-31 July 61. 31 July 61, 7p.
(Contract AF 19(626)10)
Unclassified report

DESCRIPTORS: *Data processing systems, *Printing, *Reading, Data storage systems, Reading machines, Computers, Correlation techniques, Theory, Automatic.

AD-297 401 Div. 30
(TISTW/PCR) OTS price $6.60

Naval Ordnance Lab., White Oak, Md.
TEST SET, DROP SHOCK, WOX-126A,
by V. F. DeVost. 20 Nov 62, 1v. incl. illus. tables, 5 refs. (Rept. no. NOLTR 61-106)
Unclassified report

DESCRIPTORS: *Test sets, *Drops, Test methods, Calibration, Instruction manuals, Instrumentation, Maintenance, Test equipment, Photographs, Pictures, Impact shock, Tests.

The report describes a portable 70-inch, free-fall drop tester, presents operating instructions, and contains calibration curves. The tester is an adaptation of the Mk 209 Mod 0 Test Set, which it replaces. A wide range of shocks is produced with felt, rubber, and plastic shock pads. At maximum drop height and for payloads of 1 lb., shocks range in amplitude from 170 g for the softest pad to 3200 g for the hardest pad. The durations of these shocks are 12 ms and 0.6 ms respectively. The maximum allowable load for the test set is 4 lb. For a 4-lb. payload the maximum impact velocity change experienced by the carriage is 35 fps. The report includes complete drawings on the WOX-126A Test Set and calibration information on the Mk 209 Mod 0. (Author)

AD-297 408 Div. 30
(TISTA/FRL) OTS price $3.60

Office of Research Analyses, Holloman Air Force Base, N. Mex.
ANALYSIS OF ADVANCED TRACK PERFORMANCE CHARACTERISTICS,
by Hermann F. Borges. Jan 63, 29p. incl. illus. tables, 5 refs. (Rept. no. ORA-63-1)
Unclassified report

DESCRIPTORS: *Rocket propelled sleds, Analysis, Design, Rocket motors (Liquid propellant), Rocket motors (Solid propellant), Liquid rocket propellants, Solid rocket propellants, Tracks (Aerodynamics), Tests, Specific impulses, Acceleration, Velocity.

Velocity and acceleration profiles of rocket sleds on an advanced track were determined, based on existing and advanced rocket engine and sled designs. Sled families with a unit thrust of 100,000 pounds, using propellants of different specific impulse, were postulated. Rocket assembly weight and payload weight were expressed in terms of thrust, and tank and structural weight in terms of propellant weight. (Author)

AD-297 442 Div. 30, 26
(TISTB/DGH) OTS price $2.60

System Development Corp., Santa Monica, Calif.
A BIBLIOGRAPHY ON THE USE OF SIMULATION IN MANAGEMENT ANALYSIS,
by D. G. Malcolm. 10 Nov 59, 20p. (Rept. no. SP-126)
Unclassified report

DESCRIPTORS: *Bibliographies, *Management engineering, *Operations research, Simulation, Decision-making, Automation, Computers, Industrial research.

AD-297 447 Div. 30, 23
(TISTB/AW) OTS price $1.10

System Development Corp., Santa Monica, Calif.
MAN-MACHINE SIMULATION AS A SYSTEM DESIGN AND TRAINING INSTRUMENT,
by Lawrence T. Alexander. 27 Sep 61, 5p. (Rept. no. SP-331/000/01)
Unclassified report

Paper presented at the Seventh Annual Meeting of ORSA, 1960, New York.

DESCRIPTORS: *Simulation, *Air Defense Command, Operations research, Digital computers, Training.

Bioscopic simulation is a research technique which is particularly useful for obtaining human performance data in a complex system environment. This technique can also be used to evaluate prototype configurations of man-machine systems in design stages as well as for training personnel in operating systems. It is shown how bioscopic simulation has been incorporated in the training of a large, information-processing system and how it may be used in system design. (Author)

AD-297 448 Div. 30
(TISTB/AW) OTS price $2.60

System Development Corp., Santa Monica, Calif.
SIMULATION: A SURVEY,
by Harry H. Harman. July 61, 25p. 25 refs. (Rept. no. SP-260)
Unclassified report

DESCRIPTORS: *Simulation, *Operations research, Analog computers, Digital computers, Management engineering, Classification, Time, Game theory, Monte Carlo method, Review.

Current work in simulation is appraised and definitions of the word simulation are reviewed. While the Monte Carlo Method represents a very powerful and useful technique in simulation, it does not encompass all the legitimate scientific aspects of simulation. The selection of appropriate elements of a system to be simulated and the classification of simulation types remain continuous problems in the field of simulation. The advantages of simulation as a research tool are discussed, and simulation activities are reviewed. (Author)

AD-297 450 Div. 30
(TISTB/AW) OTS price $1.10

System Development Corp., Santa Monica, Calif.
SIMULATION AS A TOOL FOR RESEARCH,
by Harry H. Harman. 25 Sep 61, 5p. (Rept. no. SP-565)
Unclassified report

Presented at the dedication of the Systems Simulation Research Laboratory, System Development Corporation, 29 Sep 61.

DESCRIPTORS: *Operations research, *Simulation, Models (Simulations).

AD-297 453 Div. 30
(TISTP/JW) OTS price $4.60

System Development Corp., Santa Monica, Calif.
A MONTE CARLO SIMULATION OF THE SACCS DATA PROCESSING CENTRAL,
by Marvin I. Gang. 18 June 62, 47p. incl. illus. tables (Rept. no. SP-825)
Unclassified report

DESCRIPTORS: *Monte Carlo method, *Mathematical analysis, Design, Analysis, Air Force research, Programming (Computers), Data processing systems, Computer logic, Simulation, Computers.

AD-297 468 Div. 30, 13
(TISTE/JBM) OTS price $3.60

Defense Research Lab., U. of Texas, Austin.
(No title).
Progress rept. no. 1, 1 Oct-31 Dec 62,
by J. V. Kahlbau. 31 Dec 62, 40p.
(Contract NObs-88181, Proj. S-F-013-11-01)
Unclassified report

DESCRIPTORS: *Pipe fittings, *Acoustic impedance, *Acoustic filters, Damping, Instruction manuals, Liquids, Special purpose computers, Circuits, Functions, Automatic, Transducers (Acoustic), Electronic equipment, Measurement, Acoustic properties.

AD-297 478 Div. 30, 27, 11
(TISTW/PCR) OTS price $8.10

Southwest Research Inst., San Antonio, Tex.
A PROTOTYPE BENCH TEST FACILITY FOR MUFFLER EVALUATION.
Final technical rept.,
by C. R. Sparks and D. J. Skinner. 1 Dec 62, 75p. (Rept. no. AR-486)
(Contract DA 44-009-eng-4953, Proj. 1177-11)
Unclassified report

DESCRIPTORS: *Test facilities, Acoustics, Pressure, Design, Noise, Engine noise, Instrumentation, Calibration, Microphones, Temperature, Gas flow, Specifications, Pictures, Engine mufflers.

AD-297 757 Div. 30, 15
(TISTP/JW) OTS price $5.60

RAND Corp., Santa Monica, Calif.
EXPERIMENTS IN LINEAR PROGRAMMING: NOTES ON LINEAR PROGRAMMING AND EXTENSIONS - PART 63,
by Leola Cutler and Philip Wolfe. Feb 63, 52p.
(Memo. no. RM-3402-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Computers, *Linear programming, Linear systems, Mathematical analysis.

AD-297 760 Div. 30, 8
(TISTW/PCR) OTS price $6.60

RCA Industrial Electronic Products, Camden, N. J.
MILLIMICROSECOND DIODE-CAPACITOR MEMORY.
Rept. on Project LIGHTNING,
by M. M. Kaufman. 3 Aug 59, 60p. (Special rept. no. 2-59)
(Contract NObsr-77523)
Unclassified report

DESCRIPTORS: *Computer storage devices, *Diodes, *Electronic switches, Tests, Microwave equipment, Transmission lines, Electric potential, Theory, Mathematical analysis, Photographs, Capacitors.

AD-297 772 Div. 30, 27, 11
(TISTW/PCR) OTS price $1.60

Southwest Research Inst., San Antonio, Tex.
A PROTOTYPE BENCH TEST FACILITY FOR MUFFLER EVALUATION.
1 Dec 62, 1v. (Appendix to rept. no. AR-486)
(Contract DA 44-009-eng-4953)
Unclassified report

DESCRIPTORS: *Test facilities, Impellers, Noise, Measurement, Design, Pictures, Engine noise, Engine mufflers.

AD-297 776 Div. 30
(TISTB/AW) OTS price $1.10

System Development Corp., Santa Monica, Calif.
OPERATING INSTRUCTIONS AND OUTPUTS OF THE J-X.2 ONE-PASS COMPILER AND LOADER,
by E. Book and H. Bratman. 13 Feb 63, 6p.
(Technical memo. no. TM-970/003/00)
Unclassified report

DESCRIPTORS: *Programming (Computers), Programming languages, Digital computers, Operation.

AD-297 779 Div. 30
(TISTP/JW) OTS price $5.60

System Development Corp., Santa Monica, Calif.
UTILITY SYSTEM PROGRAM SPECIFICATIONS. COMPUTER PROGRAM DESIGN SPECIFICATIONS FOR THE PARAMETER TEST SYSTEM MILESTONE 4,
by C. R. Frey, E. L. Griffith, and C. L. Remstad. 1 Feb 63, 53p. (Technical memo. no. TM-891/003/00)
(Contract AF 19(628)1648)
Unclassified report

DESCRIPTORS: *Computers, *Data processing systems, Handbooks, Design, Programming (Computers).

Division 30 - RESEARCH AND RESEARCH EQUIPMENT

AD-297 781 Div. 30
(TISTP/JW) OTS price $1.10

System Development Corp., Santa Monica, Calif.
MILESTONE 11 BIRD BUFFER BOOTSTRAP (SBBB),
by M. J. Sweeney. 18 Feb 63, 4p. (Technical memo. no. TM-1003/003/00)
(Contract AF 19(628)1648)
Unclassified report

DESCRIPTORS: *Computers, Magnetic tape, Programming (Computers).

AD-297 782 Div. 30
(TISTP/JW) OTS price $3.60

System Development Corp., Santa Monica, Calif.
PRELIMINARY VERSION OF STANDARDS AND CONVENTIONS FOR THE UTILITY PROGRAM AREA OF THE SATELLITE CONTROL FACILITY,
by E. L. Griffith. 6 Feb 63, 29p. (Technical memo. no. TM-1019/000/00)
(Contract AF 19(628)1648)
Unclassified report

DESCRIPTORS: *Control systems, Satellites (Artificial), Programming (Computers), Data processing systems, Design, Handbooks, Computers.

AD-297 789 Div. 30, 25
(TISTW/RD) OTS price $1.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
SYSTEMS.
Quarterly progress rept., 1 Nov 62-31 Jan 63.
15 Feb 63, 7p.
(AFESD TDR 63-21) Unclassified report

DESCRIPTORS: *Digital systems, *Data processing systems, *Modulation, *Detection, *Lasers, Signal-to-noise ratio, Fluorides, Gallium compounds, Arsenides, Glass, Alkaline earth compounds, Neodymium, Radar signals, Ranges (Distance), Design, Theory, Ruby.

AD-297 810 Div. 30, 9
(TISTE/RAM) OTS price $3.60

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
THE DESIGN AND DYNAMIC CALIBRATION OF A PRESSURE TRANSDUCER SYSTEM FOR UNSTEADY PRESSURE MEASUREMENTS,
by R. F. Austin and G. C. Trail, Jr. Mar 63, 32p. (Rept. no. AEDC TDR 63-29)
(Contract AF 40(600)1000)
Unclassified report

DESCRIPTORS: *Pressure gages, Test methods, Test equipment, Pressure vessels, Fluid dynamic properties, Resonance, Damping, Orifices, Fluid flow, Diaphragms (Mechanics), Signal-to-noise ratio, Vibration, Mathematical analysis, Measurement, Electrical equipment, Electric potential, Acoustic properties, Pressure, Calibration.

AD-297 816 Div. 30
(TISTB/CCH) OTS price $4.60

Remington Rand Univac Div., Sperry Rand Corp., St. Paul, Minn.
PROJECT LIGHTNING.
Quarterly progress rept. no. 6, vol. 1 on Phase 3, 1 Sep-30 Nov 61.
30 Nov 61, 38p. (Rept. no. PX 1599-6)
(Contract NObsr-77521)
Unclassified report

DESCRIPTORS: *Computer storage systems, *Information retrieval, *Computers, Circuits, Containers, Transistors, Operation, Memory devices, Test methods, Design.

AD-297 817 Div. 30
(TISTB/CCH) OTS price $2.60

Remington Rand Univac Div., Sperry Rand Corp., St. Paul, Minn.
PROJECT LIGHTNING.
Quarterly progress rept. no. 7, vol. 1 on Phase 3, 1 Dec 61-28 Feb 62.
28 Feb 62, 22p.
(Contract NObsr-77521)
Unclassified report

DESCRIPTORS: *Computer logic, *Computer storage systems, Errors, Test methods, Operation, Design.

AD-297 845 Div. 30
(TISTW/RD) OTS price $6.60

Naval Ordnance Test Station, China Lake, Calif.
SKYTOP-2 VERTICAL STATIC FIRING AND ALTITUDE-SIMULATION FACILITY,
by W. F. Thorn. Feb 63, 62p. (NOTS TP 3074)
(NAVWEPS rept. no. 8068) Unclassified report

DESCRIPTORS: *Rocket motors (Solid propellant), *Test facilities, Rocket motors, Guided missiles (Underwater-to-surface).

AD-297 849 Div. 30, 28
(TISTB/AW) OTS price $11.50

RAND Corp., Santa Monica, Calif.
A GUIDE TO THE GENERAL PROBLEM-SOLVER PROGRAM GPS-2-2,
by Allen Newell. Feb 63, 148p. (Memo. no. RM-3337-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Programming (Computers), *Artificial intelligence, Programming languages, Reasoning, Communication theory.

AD-297 862 Div. 30
(TISTP/TL) OTS price $13.50

Case Inst. of Tech., Cleveland, Ohio.
LOGIC OF CONTROLLED THRESHOLD DEVICES,
by H. F. Klock, G. D. Kraft, and R. D. Haney.
Dec 62, 187p. (Rept. no. EDC-6-62-1)
(Proj. 5581)
(RADC TDR 62-498) Unclassified report

DESCRIPTORS: *Digital computers, *Computer logic, *Electrical networks, Magnetic core storage, Switching circuits, Input-output devices, Design, Special functions (Mathematical), Synthesis.

AD-297 864 Div. 30, 12
(TISTA/FRL) OTS price $1.60

Aerospace Corp., Los Angeles, Calif.
BIBLIOGRAPHY OF REPORTS.
Rept. for 1 Oct-31 Dec 62,
comp. by Barbara H. Peer. 15 Feb 63, 1v.
(Rept. no. CSR-169(9990)QBR-2)
(Contract AF 04(695)169)
Unclassified report

DESCRIPTORS: *Bibliographies, Satellites, Control, Atmosphere entry, Launch vehicles (Aerospace), Propulsion, Design, Guided missiles, Spacecraft, Air force research.

AD-297 936 Div. 30, 15
(TISTP/MB) OTS price $7.60

Wolf Research and Development Corp., West Concord, Massachusetts.
MATRIX OPERATIONS PROGRAM FOR THE EXPERIMENTAL DYNAMIC PROCESSOR,
by Carmine Caso, Janet Seltzer, and James Sexton.
22 Feb 63, 66p. (Scientific rept. no. 1)
(Contract AF 19(628)1614, Proj. 4648)
(AFCRL 63-39) Unclassified report

DESCRIPTORS: *Matrix algebra, Digital computers, Programming (Computers), Computers.

AD-297 968 Div. 30, 12, 15
(TISTE/CAM) OTS price $8.60

RAND Corp., Santa Monica, Calif.
AN INTRODUCTION TO THE APPLICATION OF DYNAMIC PROGRAMMING TO LINEAR CONTROL SYSTEMS,
by F. T. Smith. Feb 63, 83p. (Memo. rept. no. RM-3526-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Programming (Computers), *Control systems, *Differential equations, Partial differential equations, Matrix calculus, Adaptive control systems, Servomechanisms, Rendezvous spacecraft, Rendezvous guidance, Orbital trajectories, Transfer trajectories, Errors, Vector analysis, Numerical analysis, Guidance, Satellites (Artificial), Linear systems.

AD-298 101 Div. 30
(TISTP/FR) OTS price $6.60

Philco Corp., Palo Alto, Calif.
MULTIPLE SATELLITE AUGMENTATION PROGRAM. DATA SUBSYSTEM DIAGNOSTIC AND MAINTENANCE COMPUTER PROGRAMS ACCEPTANCE SPECIFICATION. MILESTONE 6.
Technical operating rept.
7 Mar 63, 1v. (Rept. no. WDL-TR-2037)
(Contract AF 04(695)113)
Unclassified report

DESCRIPTORS: *Programming (Computers), *Data processing systems, Satellites (Artificial), Tracking, Telemetry data.

AD-298 122 Div. 30, 12
(TISTA/GEC) OTS price $4.60

Army Ordnance Arsenal, Philadelphia, Pa.
MULTISYSTEM TEST EQUIPMENT PROGRAM.
Quarterly technical rept. no. 3, 1 Oct-31 Dec 62,
by A. Hoffman. Feb 63, 45p. (Memo. rept. no. M63-11-3; SMUFA-1110) Unclassified report

DESCRIPTORS: *Guided missiles, *Ordnance, Ground support equipment, Automatic, Digital systems, Data storage systems, Magnetic cores, Checkout equipment.

AD-298 142 Div. 30
(TISTM/AM) OTS price $2.75

Aerospace Corp., Los Angeles, Calif.
TEMPERATURE MEASUREMENT,
by John I. Slaughter and John L. Margrave.
30 Oct 62, 122p. incl. illus. tables, 217 refs.
(Rept. no. TDR-169(3240-20)TN-1)
(Contract AF 04(695)169)
(SSD TDR 62-140) Unclassified report

DESCRIPTORS: *Temperature, *Reviews, *Temperature sensitive elements, Solids, Surface temperatures, Liquids, Gases, Plasma physics, Bibliographies, High-temperature research, Measurement.

A review of the methods used for temperature measurement as reported in the scientific and industrial literature is presented. Temperature scales, temperature standards, and temperature measurements of solids and liquids, surfaces, gases, and plasmas are discussed with the aid of an extensive bibliography. Measurement problems relating to materials research at temperatures above 1000 C are emphasized. (Author)

31. SHIPS AND MARINE EQUIPMENT

AD-297 292 Div. 31
(TISTE/CRJ) OTS price $1.60

David Taylor Model Basin, Washington, D. C.
GENERAL INSTABILITY OF RING-STIFFENED CYLINDRICAL SHELLS SUBJECT TO EXTERNAL HYDROSTATIC PRESSURE,
by Thomas E. Reynolds and William F. Blumenberg.
June 59, 13p. incl. illus. tables (Rept. no. 1324)
(Proj. NS 731-038)
Unclassified report

DESCRIPTORS: *Submarine hulls, *Hydrodynamic configuration, Cylindrical bodies, Elasticity, Failure (Mechanics), Test methods, Non-destructive testing, Bulkheads, Hydrostatic pressure, Stiffened cylinders.

Hydrostatic pressure tests were conducted on four machined, ring-stiffened cylinders of different lengths to investigate the influence of end fixity on the elastic general-instability pressure. Each cylinder was tested nondestructively with several different end conditions. Pressure variations of as much as 65% were observed for a particular cylinder. Other tests were conducted with one cylinder reinforced by internal movable bulkheads whereby buckling pressures were obtained as a function of bulkhead spacing. The resulting experimental curve confirms the existence of discontinuities which occur, according to Kendrick's theory, at the transition between two circumferential buckling modes. (Author)

AD-297 309 Div. 31
(TISTE/OHD) OTS price $1.10

Naval Research Lab., Washington, D. C.
A CAPSTAN FOR DEEP-SEA HOISTS,

by W. L. Jones, C. L. Buchanan and J. J. Gennari. 31 Dec 62, 6p. incl. illus. table (NRL rept. no. 5878)
Unclassified report

DESCRIPTORS: *Hoists, *Cable reels, Cables (Mechanical), Storage, Tensile properties, Tests, Oceanographic equipment, Underwater equipment.

A novel capstan design has been developed. The capstan consists of two identical slotted cylindrical drums which rotate intermeshed on axes which are both offset and canted with respect to each other. The operation of this capstan is somewhat similar in principle to that of the winding reels which were originally employed in the textile industry. However this version, through an arrangement of eccentric journals, is capable of continuously winding and laterally advancing a heavily loaded cable in such a manner that it aligns itself on the capstan and consistently follows the same path. Test results obtained using models indicate such a capstan meets requirements for use as the traction member of a deep-sea hoist. (Author)

AD-297 120 Div. 31, 30
(TISTE/OHD) OTS price $10.50

David Taylor Model Basin, Washington, D. C.
TMB 2-, 3-, AND 4-BLADED SUPERCAVITATING PROPELLER SERIES,
by E. B. Caster. Jan 63, 138p. incl. illus. tables, 8 refs. (Rept. no. 1637)
(Navy Proj. S-R009-01-01)
Unclassified report

DESCRIPTORS: *Propellers (Marine), Hydrodynamics, Hydrodynamic configurations, Theory, Computers, Mathematical analysis, Cavitation.

A theoretically derived series of 2-bladed supercavitating propellers with expanded area ratios of 0.3, 0.4, and 0.5; 3-bladed propellers with expanded area ratios of 0.4, 0.5, and 0.6; and 4-bladed propellers with expanded area ratios of 0.5, 0.6, and 0.7 are presented. These propellers have a specified radial distribution of the section chord and a hub radius of 0.2 of the propeller radius. The series data are plotted in the form of nondimensional coefficients so that the performance of the propellers can be easily predicted and a complete design obtained if desired. (Author)

AD-297 474 Div. 31, 9
(TISTW/PCR) OTS price $6.60

Technical Research Group, Syosset, N. Y.
UNSTEADY LIFT, MOMENT, AND CAVITY LENGTH CALCULATIONS FOR AN OSCILLATING PARTIALLY CAVITATED HYDROFOIL,
by Herbert Steinberg. Sep 62, 1v. (Rept. no. TRG-153-SR-2)
(Contract Nonr-343400, Proj. S-4009 01 01)
Unclassified report

DESCRIPTORS: *Hydrofoils, Mathematical analysis, Cavitation, Lift, Moments, Oscillation, Series, Integrals, Pressure, Velocity, Acceleration, Fluids, Density, Bessel functions, Equations, Theory.

AD-297 762 Div. 31, 30
(TISTE/RAM) OTS price $3.60

David Taylor Model Basin, Washington, D. C.
A PROCEDURE FOR DETERMINING THE VIRTUAL MASS j-FACTORS FOR THE FLEXURAL MODES OF A VIBRATING BEAM,
by G. Wayne Dutton and Ralph C. Leibowitz. Aug 62, 37p. (Rept. no. 1623)
Unclassified report

DESCRIPTORS: *Ship hulls, *Beams (Structural), Frequency, Deformation, Load distribution, Bessel function, Partial differential equations, Digital computers, Test methods, Ships, Mathematical analysis, Simulation, Vibration, Theory.

AD-297 931 Div. 31, 25
(TISTP/JW) OTS price $8.60

Southwest Research Inst., San Antonio, Tex.
EXPERIMENTAL DETERMINATION OF OSCILLATORY LIFT AND MOMENT DISTRIBUTIONS ON FULLY SUBMERGED FLEXIBLE HYDROFOILS,
by Guido E. Ransleben, Jr. and H. Norman Abramson. 1 Nov 62, 86p. (Technical rept. no. 2)
(Contract Nonr-333500, Proj. 38-1028-2)
Unclassified report

DESCRIPTORS: *Hydrofoils, Oscillators, Lift, Moments, Distribution, Underwater.

AD-298 131 Div. 31, 30
(TISTW/PCR) OTS price $2.60

David Taylor Model Basin, Washington, D. C.
RESISTANCE TESTS OF A MODEL OF THE GERMAN E-BOAT,
by Eugene P. Clement. Jan 63, 25p. (Rept. no. 1703)
Unclassified report

DESCRIPTORS: *Motor torpedo boats, Model basins, Ship models, Water tunnels, Marine rudders, Tests, Test methods, Photographs, Model tests.

32. MISCELLANEOUS ARTS AND SCIENCES

AD-297 030 Div. 32
(TISTB/LMH) OTS price $5.60

RAND Corp., Santa Monica, Calif.
THE CORE OF AN ECONOMY WITH NONCONVEX PREFERENCES,
by L. S. Shapley and Martin Shubik. Feb 63, 46p. incl. illus. 20 refs. (Memo. RM-3518-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Economics, Costs, Scheduling, Game theory, Sociology, Industrial production, Mathematical prediction.

A model of a pure exchange economy is investigated without the usual assumption of convex preference sets for the participating traders. The concept of core, taken from the theory of games, is applied to show that if there are sufficiently many participants, the economy as a whole will possess a solution that is sociologically stable--i.e., that cannot be upset by any coalition of traders. (Author)

AD-297 381 Div. 32, 30
(TISTB/DGH) OTS price $13.00

Indiana U., Bloomington.
AUTOMATIC LANGUAGE ANALYSIS.
Final technical rept.,
by J. P. Thorne. 31 Dec 62, 172p. incl. illus. tables, refs.
(Contract AF 30(602)2185)
(RADC TDR 63-11) Unclassified report

DESCRIPTORS: *Language, *Artificial intelligence, Data processing systems, Data storage systems, Information retrieval, Automatic, Machine translation, Coding, Dictionaries, Programming (Computers), Indexes, Vocabulary, Analysis, Language.

Research has been directed towards the development of a device which would process and store completely unedited English language texts and print out answers to questions regarding these texts presented to it in their natural language form. The approach followed requires that the computer itself syntactically analyze input text in order to convert it into a special form called FLEX, which preserves only that syntactic information which is useful for data retrieval purposes. In their FLEX forms sentences can be compared to determine the degree of their relationship to each other in respect to both word-meaning and propositional meaning. A high correlation between a text sentence and a question indicates that the text sentence is a relevant answer. The problems of construction, a device of the kind proposed, are discussed in some detail. The report also describes an approach to the mechanical analysis of language. It also contains an account of a version of FLEX and of certain preliminary experiments in weighting syntactic information. The fourth section briefly lists the conclusions and recommendations, both positive and negative, which may be drawn from the work of the project. (Author)

AD-297 454 Div. 32
(TISTB/DGH) OTS price $4.60

System Development Corp., Santa Monica, Calif.
ARMS CONTROL: THE SEARCH FOR AN ACCEPTABLE RESEARCH METHODOLOGY,
by Robert H. Davis. 17 Dec 62, 39p. incl. illus. 25 refs. (Rept. no. SP-1047)
Unclassified report

Portions presented at the International Arms Control Symposium, December 17-20, 1962, the University of Michigan, Ann Arbor, Michigan.

DESCRIPTORS: *Armament, *Social sciences, Political science, Economics, Game theory, Motivation, Acceptability, Simulation, Control, Models (Simulation).

AD-297 517 Div. 32
(TISTB/AW) OTS price $1.10

Thompson Ramo Wooldridge, Inc., Canoga Park, Calif.
PHONEME TO GRAPHEME IN ENGLISH.
Report on Machine Translation of Speech into Orthographic English,
by Edith Crowell Trager. 25 Feb 63, 3p. (Technical note no. 1)
(Contract AF 49(638)1186)
Unclassified report

DESCRIPTORS: *Machine translation, *Speech representation, Speech.

AD-297 745 Div. 32, 2
(TISTW/RD) OTS price $5.60

California U., Berkeley.
NOTES ON THE GEOGRAPHY AND HISTORY OF DOMINICA,
by William C. Clarke. Nov 62, 57p.
(Contract Nonr-365603, Proj. NR 388 067)
Unclassified report

DESCRIPTORS: *Geography, *History, Agriculture, Terrain, Soils, Rainfall, Plants (Botany), Trees, Transportation, Economics, Tropical regions.

33. TRANSPORTATION

No Entries

NON-MILITARY AND OLDER MILITARY RESEARCH REPORTS

*Descriptors marked with an asterik are included in the subject index.

ASTRONOMY

Astrophysics

NASA N63-12353 OTS $2.60

Boston U., Mass.
CATALOG OF LUNAR CRATERS I, by Gerald S. Hawkins and Peter W. Mitchell. Research rept. no. 4 on Grant NsG-246-62. Nov 62, 24p. 3 refs. Astronomical contribution series 11 no. 22.

NASA N62-16910 OTS $2.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
ON THE QUESTION OF CAPTURE IN A RESTRICTED CYCLICAL PROBLEM OF THREE BODIES, by V. A. Egorov, trans. by J. L. Zygielbaum. Rept. on Contract NAS7-100. 4 June 62, 28p. 7 refs. Astronautics information trans. no. 28.

Trans. of Iskusstvennye Sputniki Zemli (USSR) 1959, no. 3, p. 3-12.

BEHAVIORAL SCIENCES

Psychology

PB 162 917 OTS $5.60

Aviation Psychology Lab., U. of Illinois, Urbana.
MONITORING OF COMPLEX VISUAL DISPLAYS: I. EFFECTS OF RESPONSE COMPLEXITY AND INTERSIGNAL INTERVAL ON VIGILANT BEHAVIOR WHEN VISUAL LOAD IS MODERATE, by Jack A. Adams and Lawrence R. Boulter. Rept. on Contract AF 19(604)5705. 30 Oct 60, 53p. 25 refs. Technical note AFCCDD-TN-60-63; AD-250 789.

DESCRIPTORS: *Visual perception, *Reasoning, Statistical analysis, *Reaction (Psychology) Radar equipment, Plan-position indicators, Computers, *Human engineering, Test methods, *Radar operators, Detection, Visual signals, *Attention, *Behavior, *Aviation personnel, *Display systems.

A laboratory experiment was performed, within the context of a surveillance task patterned after that of SAGE, on the human operator's speed in detecting the occurrence of random signals over a continuous three-hour period of monitoring a display with six aircraft symbology units. Changes in behavior over the three hours were evaluated as a function of mean intersignal interval and response complexity. Virtually all signal changes were detected. When response requirements were simple and the subject merely had to detect the occurrence of a change, some decrement over the three hours was observed for response speed, but when the response involved a four-choice decision no decrement was found. Evidence was presented for some of the decrement being associated with a deterioration of effective visual scanning of spatially disparate stimulus sources. Results were seen in support of a sensory variation hypothesis where variety in the external environment and in internal response-produced stimuli are factors in sustaining alertness, and thus responsiveness. The hypothesis is considered to be in a preliminary form. (Author)

PB 162 948 OTS $2.60

Cornell U., Ithaca, N. Y.
DISTANCE CONSTANCY. THE EFFECTS OF WINDOWS OF TWO SIZES ON MATCHES OF OBJECTIVE VELOCITY [AND] APPARATUS FOR THE STUDY OF VISUAL TRANSLATORY MOTION, by Olin W. Smith and James J. Gibson. Research rept. on The Visual Perception of Motion and Space, Contracts Nonr-401(14) and AF 33(038) 22804. Sep 56, 28p. 15 refs. AD-115 540.

DESCRIPTORS: *Visual perception, *Space perception, *Motion, Perception, Tests.

PB 162 949 OTS $1.60

Tulane U., New Orleans, La.
THE PERCEPTION OF THE VERTICAL. XIII: AN INVESTIGATION OF QUADRANT DIFFERENCES, by Cecil W. Mann and James T. Ray. Rept. on Contract Nonr-475(05). 18 May 56. 17p. 8 refs. Joint Project NM 001 110 500, rept. no. 39; AD-107 736.

DESCRIPTORS: *Proprioception, *Space perception, Perception, Tests, Statistical analysis.

An experiment was designed to investigate the possibility of right and left quadrant differences in the judgment of the postural vertical. Under the conditions of this experiment, no quadrant differences of statistical significance were found. The prediction that differences would be found among subjects tested, and under the interacting conditions producing adaptation was justified. (Author abstract)
(Behavioral Sciences--Psychology, 5 June 63)

BIOLOGICAL SCIENCES

TID-15829 OTS $1.60

Harvard U., Cambridge, Mass.
ION TRANSPORT IN E. COLI, by A. K. Solomon. Progress rept. 1 Jan-31 Dec 61, on Contract AT(30-1)2453. 4 May 62, 12p.

PB 160 157 OTS $1.60

Naval Medical Research Inst., Bethesda, Md.
LABORATORY STUDIES OF MONKEYS WITH AND WITHOUT SHIGELLA INFECTION, by L. A. Barnes, R. C. Durant, and W. H. Mackey. Vol. 13, p. 467-480. 4 Aug 55, 15p. 5 refs. Research rept. on Project N Project NM 005 048.04.20.

DESCRIPTORS: *Primates, *Shigella infections, Epidemiology, Metabolic products.

Following an observation that certain monkeys with moderately severe diarrhea were excreting Shigella flexneri 3, laboratory studies of the condition were extended to a larger colony of the animals. The observations included bacteriologic examinations, recording of the consistency of the stool specimens, and determinations of the reducing sugar contents of fecal extracts.

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Public Health Service, Washington, D. C.
UNDERSTANDING THE BRAIN AND NERVOUS SYSTEM. RESEARCH ADVANCES IN NEUROLOGICAL AND SENSORY DISORDERS, by Richard L. Masland. 1962, 83p. 4 refs. Publication no. 962.

DESCRIPTORS: *Brain, *Nervous system, Neurology, *Injuries, *Diseases, *Sensory mechanisms, *Muscles, Eye, Epilepsy, Headache, Hearing, Speech disorders, *Mental deficiency, Multiple sclerosis, Parkinsonism, *Pregnancy, *Infants, *Children, Cardiovascular system.

Contents:
Accident and injury to the brain and nervous system
Epilepsy
Eye disorders
Headache
Hearing and speech disorders
Mental retardation
Multiple sclerosis
Muscular dystrophy and other neuromuscular diseases
Parkinson's disease
Perinatla research (cerebral palsy, mental retardation, and related disorders of infancy and childhood)
Strokes and other cerebrovascular disorders

TID-17234 OTS $3.60

Utah State U., Logan.
ISOLATION AND CHARACTERIZATION OF NATURALLY-OCCURRING RIBONUCLEIC ACID FORMS OF PLANT VIRUSES AND THEIR RELATIONSHIPS WITH NUCLEOPROTEIN VIRUSES AND HOST METABOLITES, by George W. Cochran, Amrik S. Dhaliwal and others. Progress rept. on Contract AT(11-1)1150. 1962. 38p. 7 refs.

AD-295 028 OTS repriced $0.75

Bryn Mawr Coll., Pa.
BODY TEMPERATURE AND CARBOHYDRATE VALUES IN NORMAL AND ENDOTOXIN POISONED MICE EXPOSED TO LOWER ENVIRONMENTAL TEMPERATURES, by John E. DeTurck and L. Joe Berry. Rept. on Contract AF 41(657)340. Aug 62, 28p. 67 refs. Rept. no. AAL-TDR-62-4.

DESCRIPTORS: *Body temperature, *Carbohydrates, Mice, *Poisoning, *Bacterial toxins, *Exposure, Glycogen, Liver, Muscles, *Starvation, Toxins and antitoxins.

A comparison is made between the rectal and the body surface temperatures of fed mice housed in individual compartments without bedding while exposed continuously to environmental temperatures of 5°C, 15°C and 25°C. Surface temperatures of the mice are related to the ambient temperature at which they are held. Rectal temperatures are known to undergo cyclic variations and except for the first 24 hours at 5°C, are within normal limits throughout a week of exposure. Fasted animals at 5°C cannot maintain a core temperature beyond about 6 to 12 hours and alldie within 24 hours. Injection of an LD_{50} dose of endotoxin fails to depress liver and muscle glycogen and total body carbohydrate after three hours at 15°C, but after an exposure of five hours liver glycogen alone remained unchanged. At 5°C, carbohydrate reserves were depleted in liver, muscle and total body after three hours in fasted mice but not in fed mice. After five hours, muscle glycogen alone was lowered. Endotoxin poisoned mice lost carbohydrates after three hours and five hours at both 5°C and 15°C. (Author)

PB 163 001 OTS $1.10

Naval School of Aviation Medicine, Pensacola, Fla.
THE INFLUENCE OF PROLONGED STAY IN THE DARK ON FOVEAL DARK ADAPTABILITY, by H. S. Fang, A. L. Hall, and T. F. Hwang. 12 Oct 53, 10p. 7 refs. Proj. no. NM 001 059.30.01; AD-27 393.

DESCRIPTORS: *Dark adaptation, Light, Colors, Eye, Retina.

Two male subjects trained in the operation of the Nagel adaptometer were individually exposed to a 200-lux white light for 5 min. The subjects were then exposed in the dark and tested for foveal dark adaptability. The test field subtending a visual angle of 1° was circular, and a 765-mμ red filter was placed over the test field. A small star of red light used as a fixation point was placed just within the upper margin of the test field. The threshold of relative-stimulation intensity decreased very rapidly within the first 1 to 2 min of dark adaptation, and the foveal dark adaptability became constant from 2 or 3 to 90 min later. After 3 hr in the dark, the dark adaptation of the cone portion showed slight improvement with little lowering of threshold. The foveal dark adaptability increased 100% after 5-7 hr, and the maximum improvement in cone adaptation appeared between 8 and 10 hr. (ASTIA abstract)

Radiobiology

TID-16080 OTS $1.10

Athens U. School of Medicine (Greece).
(RADIATION EFFECTS ON BLOOD AND BONE MARROW]. Final annual progress rept. for 16 May 61-15 May 62, on Contract AT(30-1)2769. 18 June 62, 11p.

UCLA-497 OTS $1.60

California U., Los Angeles. School of Medicine.
THE OCCURRENCE, EFFECT AND UTILIZATION OF SPECIFIC ISOTOPES IN THE ENVIRONMENT: REVIEW AND DISCUSSION OF BARIUM, by Norman R. French. Rept. on Contract AT(04-1)GEN-12. Dec 61, 18p. 33 refs.

TID-17242 OTS $1.10

National Inst. for Research in Dairying, U. of Reading (Gt. Brit.)
THE DIGESTION, ABSORPTION, TRANSPORT AND METABOLISM OF FATS IN THE RUMINANT. Progress rept., Sep 61-Feb 62, on Contracts AT(30-1)2635 and IAEA-70/US. 8 Nov 62, 4p.

TID-17243 OTS $1.10

National Inst. for Research in Dairying, U. of Reading (Gt. Brit.)
THE DIGESTION, ABSORPTION, TRANSPORT AND METABOLISM OF FATS IN THE RUMINANT. Progress rept., Sep 61-May 62, on Contracts AT(30-1)2635 AND IAEA-70/US. 8 Nov 62, 5p. 10 refs.

TID-17241 OTS $1.10

National Inst. for Research in Dairying, U. of Reading (Gt. Brit.)
THE TRANSPORT OF TRITIUM-LABELLED TRIGLYCERIDE FROM THE RUMEN TO THE MILK IN THE COW, by R. F. Glascock and E. W. Wright. Rept. on Contracts AT(30-1)2635 and IAEA-70/US. 1961. 9p. 10 refs.

Zoology

AD-282 661 OTS $19.75

6571st Aeromedical Research Lab., Holloman AFB, N. Mex.
THE CHIMPANZEE. A TOPICAL BIBLIOGRAPHY, by Frederick H. Rohles, Jr. June 62, 314p. 2350 refs. ARL-TDR-62-9; NASA N62-15702.

DESCRIPTORS: *Primates, *Bibliography, Anatomy, Physiology, Pathology medicine, Psychology, Biology, Pharmacology

This bibliography encompasses the following areas of research on the chimpanzee: anatomy, physiology and pharmacology, pathology and experimental medicine, psychobiology, and miscellaneous researches. (Author)

PB 160 154 OTS $1.60

Naval Medical Research Inst., Bethesda, Md.
NOTES ON THE BIOLOGY AND CONTROL OF MOSQUITOES AT UMIAT, ALASKA, by Leo A. Jachowski and Carlos Schultz. Rept. no. 1 on Project NM 005 017. 12 Jan 48, 20p. 2 refs.

DESCRIPTORS: Biology, *Pest control, *Mosquitoes, *Alaska, DDT, Fuel oil, Insecticides.

The Arctic mosquitoes, all of the genus Aedes, found at Umiat, Alaska, have only a single generation annually. They overwinter in the egg stage and hatch as soon as the ice thaws from around the eggs in the spring. Larval development requires almost a month, pupal development about five days, and the adult female mosquitoes persist until the first heavy frost. Weather conditions also play an important role in the growth and activity. In the control program aerial spraying of fuel oil alone as a larvicide was unsatisfactory, while spraying with a 5 per cent solution of DDT in fuel oil produced erratic results. Five and 10 per cent solutions of DDT in fuel oil applied aerially in a dosage of 0.2 and 0.4 pounds of DDT per acre markedly reduced the adult mosquito for approximately five days. (Author)

CHEMISTRY

TID-8213 OTS $1.00

Bureau of Mines, Washington, D. C.
DEVELOPMENT OF DEPLETED-URANIUM CATALYSTS FOR DESTRUCTION OF AIR POLLUTANTS IN AUTOMOBILE EXHAUST. PART I. DEVELOPMENT OF CATALYSTS CONTAINING DEPLETED URANIUM. PART II. OPERATION OF MOBILE-LABORATORY TEST VEHICLE. Rept. on Research progress, Fiscal Year 1962. Jan 63, 48p. 5 refs.

Analytical Chemistry

TID-13380 OTS $1.10

Laboratory for Nuclear Science, Mass. Inst. of Tech., Cambridge.
CRUSHED UNFUSED VYCOR AS A SUPPORT FOR GAS CHROMATOGRAPHY, by L. B. Rogers and Jeffry C. Spitzer. Rept. on Contract AT(30-1)905. 1960, 3p. 2 refs.

UCRL-10575 OTS $2.25

Lawrence Radiation Lab., U. of California, Berkeley.
KINETIC ANALYSIS OF CONSECUTIVE-REACTION MODEL SYSTEMS, by Howard R. Siewert, Peter N. Tenney, and Theodore Vermeulen. Rept. on Contract W7405-eng-48. 30 Nov 62, 105p. 11 refs. NASA N63-12421

MCW-1479 OTS $1.00

Mallinckrodt Chemical Works, Weldon Spring, Mo.
PROCESS DEVELOPMENT QUARTERLY PROGRESS REPORT, July-Sep 62. Rept. on Contract W14-108-eng-8. 1 Nov 62, 40p. 7 refs. NASA N63-12022.

PB 162 921 OTS $1.60

Naval Ordnance Lab,, White Oak, Md.
AN IMPROVED METHOD FOR THE ASSAY OF LEAD AZIDE, by S. G. Lansman and J. M. Rosen. 15 Dec 55 17p. 5 refs. NAVORD rept. 4191; AD-88 107.

DESCRIPTORS: *Detonators, *Lead compounds, *Azides, Additives, *Dextrins, *Polyvinyl alcohol, Chemical analysis, Fractionation, Titration.

An improved method of assaying lead azide containing dextrin or polyvinyl alcohol is based on the quantitative distillation of the volatile hydrazoic acid produced in the reaction between lead azide and dilute sulfuric acid. The hydrazoic acid is collected in a receiver containing a measured quantity of ceric oxidant with which it reacts to produce nitrogen as follows:
$2\,N_3^- \quad 2\,Ce(IV) \longrightarrow 3\,N_2 + 2\,Ce(III)$. Excess cerate is determined by a titration using a standardized sodium oxalate solution. Dextrin or other non-volatile organic substances in lead azide do not interfere with the distillation procedure whereas they produce high assays in the Navy specification method of analysis. (Author)

Physical Chemistry

PB 162 470 OTS $1.60

Battelle Memorial Inst., Columbus, Ohio.
RELATION OF ODOR TO PHYSICOCHEMICAL PROPERTIES OF COMPOUNDS, by Howard G. Schutz, Louis J. Hillenbrand, and Horace W. Ray. Quarterly progress rept. no. 1, 5 Dec 59-4 Mar 60, on Contract DA 19-129-qm-1500. [1960] 11p. 3 refs. File no. P-1115; AD-237 834.

DESCRIPTORS: Physical chemistry, *Odors, *Olfactory thresholds, Chromatographic analysis, Measurement, Determination, Intensity, Classification, Digital computers, Mathematical analysis, Statistical analysis

Selection and collection of 18 physicochemical properties was completed for 30 compounds. Subjective odor parameters for 30 compounds for suprathreshold intensity, absolute thresholds, rate of adaptation, and factor scores on specific qualities were also compiled. A computer program for obtaining multiple-regression equations was developed. Plans were made for gas chromatographic analogue of the olfactory process, and for absolute and suprathreshold measurement. (Author)

PB 162 469 OTS $1.60

Battelle Memorial Inst., Columbus, Ohio.
RELATION OF ODOR TO PHYSICOCHEMICAL PROPERTIES OF COMPOUNDS, by Howard G. Schutz, Horace W. Ray, and E. Jack Kahler. Quarterly progress rept. no. 2, 5 Mar-4 June 60, on Contract DA 19-129-qm-1500. [1960] 17p. 3 refs. File no. P-1115; AD-248 886.

DESCRIPTORS: Tissues (Biology), Nerves, Mathematical analysis, Statistical analysis, *Olfactory thresholds, Physical chemistry, Digital computers, Chromatographic analysis, Chemical reactions, Programming, Serum, Measurement, Determination, *Factor analysis, Adsorption, Classification, Albumins, *Odors, Blood

Rank order intercorrelation matrix was computed for 18 physiocochemical and 12 subjective odor parameters. A multiple-group factor analysis was conducted on the above matrix and rotated to simple structure. Five physicochemical factors resulted which were tentatively named according to physical and olfactory process involved. Experiments were conducted with gas chromatographic columns analogous to olfactory process including mucous (water, albumin), serous (blood serum), and nerve tissue (brain homogenate), using odorants investigated in previous contract. Tables were prepared giving retention time for the odorants studied. (Author) (See also PB 162 470)

PB 162 468 OTS $1.60

Battelle Memorial Inst., Columbus, Ohio.
RELATION OF ODOR TO PHYSICOCHEMICAL PROPERTIES OF COMPOUNDS, by Howard G. Schutz, Horace W. Ray, and R. B. Iden. Quarterly progress rept. no. 3, 5 June-4 Sep 60, on Contract DA 19-129-qm-1500. [1960] 14p. 3 refs. File no. P-1115; AD-250 467.

DESCRIPTORS: Physical chemistry, *Odors, *Olfactory thresholds, *Factor analysis, Chromatographic analysis, Chemical properties, Physical properties, Measurement, Classification, Psychology, Determination, Statistical analysis, Adsorption, Tissues (Biology)

Nine quality factors were named that were obtained from Q-factor analysis of odorants. Multiple regression analyses were completed for eight psychological odor parameters using selected physicochemical properties. Regression equations were written and multiple correlation coefficients computed. Gas chromatographic analyses were conducted for selected chemicals using a wool column to represent the cholinesterase-inhibiting activity of the odorants. Plans were made for work on absolute threshold and suprathreshold intensities. (Author) (See also PB 162 469)

PB 162 478 OTS $4.60

Battelle Memorial Inst., Columbus, Ohio.
RELATIONSHIP BETWEEN FLAVOR AND PHYSICOCHEMICAL PROPERTIES OF COMPOUNDS, by Howard G. Schutz, Reynolds C. Overbeck, and Richard S. Laymon. Rept. no. 3 (Final), 12 Apr-31 Oct 58, on Contract DA 19-129-qm-1141. 31 Oct 58, 46p. 21 refs. File no. P-1115.

DESCRIPTORS: *Taste, Physical chemistry, *Olfactory thresholds, Mathematical analysis, *Factor analysis, Surface tension, Vapor pressure, Spectrographic analysis, *Odors, Statistical analysis.

Work is reported on the following topic: (1) An experiment on adaptation and cross-adaptation was conducted in which 10 subjects rated the intensity of 30 diverse odorants (on a 9-point scale) at suprathreshold levels for a 10-minute period, at which time they rated a second odorant to yield cross-adaptation information. The results of this study revealed a high reliability of rating performance, distinct differences in adaptation rate, and no consistent evidence of cross-adaptation. (2) Physico-chemical data were collected on the 30 odorants for vapor pressure, surface tension, infrared, ultraviolet, and Raman spectra, hemolytic ac-

celerating activity, and adsorption on columns of charcoal, alumina, silica gel, Fuller's earth and lecithin. (3) Rank-order correlations were computed among the physico-chemical variables and nine factors obtained in a factor analysis of the 30 odorants, rate of adaptation, and intensity. A multiple correlation coefficient was computed between the physico-chemical variables and the first two factors and intensity, which reached 0.70 in all cases. (4) The results are discussed and interpreted in the light of current olfactory theory and recent experimental evidence. (Author) (See also PB 162 469)

WAPD-T-1268 OTS $2.60

Bettis Atomic Power Lab., Pittsburgh, Pa.
SOME OBSERVATIONS CONCERNING ALPHA-BETA TRANSITIONS IN HYDROGEN-PALLADIUM, by F. W. Pement and W. T. Lindsay, Jr. Rept. on Contract AT(11-1)GEN-14. Oct 60, 23p. 22 refs.

TID-16556 OTS $1.60

Brown U., Providence, R. I.
OXYANIONS AND PEROXIDES: THEIR CONSTITUTIONS AND REACTION MECHANISMS, by John O. Edwards. Annual rept. on Contract AT(30-1)1983. 20 Aug 62, 5p.

UCRL-10421 OTS $1.50

Lawrence Radiation Lab., U. of California, Berkeley.
CONCENTRATION AND VELOCITY PROFILES IN A STEFAN DIFFUSION TUBE, by Fred J. Heinzelmann, Darshanlal T. Wasan, and Charles R. Wilke. Rept. on Contract W7405-eng-48. 16 Aug 62, 69p. 16 refs. NASA N63-11177.

TID-16402 OTS $1.10

Minnesota U., Minneapolis.
FLUORESCENT AND FLASH-PHOTOLYTIC STUDIES OF THE ROLE OF RHODOPSIN IN SCOPTIC VISION, by Robert Livingston. Final rept. on Contract AT(11-1)718. 25 July 62, 4p.

TID-16822 OTS $10.10

Worcester Polytechnic Inst., Mass.
THE RELATIONSHIP BETWEEN OXIDE FILMS AND ELECTRODE POTENTIALS, by Robert C. Plumb. Annual progress rept. 1 Jan-15 Sep 62, on Contract AT(30-1)2479. 1962. 123p. 26 refs.

AD-297 099 OTS $7.60

Air Force Cambridge Research Labs., Bedford, Mass.
SUPERPRESSURE BALLOON FOR CONSTANT LEVEL FLIGHT, by L. A. Grass. Aug 62, 72p. 14 refs. Instrumentation for Geophysics and Astrophysics no. 21; AFCRL-62-824.

DESCRIPTORS: *Balloons, *Pressure, *Meteorological balloons, Stratosphere, Density, Temperature, Lift, *Geophysics, Instrumentation, Design, Flight testing

Superpressure balloons are highly stable platforms for long-duration experiments in the stratosphere, capable of remaining at constant-density altitude, without ballast, despite diurnal fluctuations in 'superheat' of the lifting gas. Duration is theoretically limited only by eventual deterioration of the plastic or loss of gas by permeation. Equations relating superpressure, superheat, and free lift are derived. Developmental problems, design, cold-chamber testing, and relative merits of cylinder, tetrahedron, onion, and sphere are discussed. Flight data confirm capability of laminated-Mylar spheres with preformed end caps and bi-tape seals. (Author)

AD-281 059 OTS $2.60

Columbia U., New York
PORT-ÉTIENNE: MAURITANIA'S NEW GATEWAY TO THE WORLD, by Richard J. Peterec. Rept. on Contract Nonr-266(29). [1962] 24p. 22 refs. Technical rept. Cu 22-62-Nonr 266(29) Geog.

DESCRIPTORS: *Harbors, French West Africa, Commerce, Economics, Fishes, Minerals, Transportation, Geography.

UCRL-10008 OTS $1.60

Lawrence Radiation Lab., U. of California, Berkeley.
THE TIDES: A DYNAMIC EXPLANATION BASED UPON FUNDAMENTAL PHYSICAL CONCEPTS, by Ira P. Pratt, Jr. Rept. on Contract W7405-eng-48. Jan 62, 15p. 8 refs.

NASA N63-13990 OTS $6.60

Rand Corp., Santa Monica, Calif.
MAGNETIC FIELDS OF THE EARTH AND PLANETS, by J. W. Kern and E. H. Vestine. Rept. on Contract NASr-21(05) Mar 63, 66p. 143 refs. Memo RM-3523-NASA.

Geology

Order from GPO $1.00 as
I 19.13:1539-L

Geological Survey, Washington, D. C.
GEOLOGY AND GROUND-WATER RESOURCES OF THE FAIRFAX QUADRANGLE, VIRGINIA. CONTRIBUTIONS TO THE HYDROLOGY OF THE UNITED STATES, by Paul M. Johnston. 1962, 68p. 59 refs. Geological Survey Water-Supply paper 1539-L.

DESCRIPTORS: Geological survey, *Virginia, Water supplies, *Hydrology, Sources, *Geology, Chemical properties

Order from GPO $0.45 as
I 19.13:1619-M

Geological Survey, Washington, D. C.
GROUND-WATER RESOURCES OF COW VALLEY, MALHEUR COUNTY, OREGON. CONTRIBUTIONS TO THE HYDROLOGY OF THE UNITED STATES, by S. G. Brown and R. C. Newcomb. 1962, 42p. 2 refs. Geological Survey Water-Supply paper 1619-M.

DESCRIPTORS: Geological survey, *Oregon, Water supplies, *Hydrology, Sources, Irrigation systems

Order from GPO $3.00 as
I 19.16:345

Geological Survey, Washington, D. C.
PETROLOGY AND GEOCHEMISTRY OF SELECTED TALC-BEARING ULTRAMAFIC ROCKS AND ADJACENT COUNTRY ROCKS IN NORTH-CENTRAL VERMONT, by Alfred H. Chidester. 1962, 220p. 134 refs. Geological Survey Professional Paper 345.

DESCRIPTORS: Geological survey, *Vermont, *Rock (Geology), Igneous rock, *Talc, Minerals, Rock-forming minerals, *Petrology, *Geochemistry

UCRL-7133 OTS $0.50

Lawrence Radiation Lab., U. of California, Livermore.
BOREHOLE TV CAMERA GIVES GEOLOGISTS INSIDE STORY, by Nicholas M. Short. Rept. on Contract W7405-eng-48. 5 Nov 62, 22p.

TID-15993 Available on loan from OTS

Sandia Corp., Albuquerque, N. Mex.
SYNTHESIS OF SHOCK HUGONIOTS FOR ROCK MATERIALS, by A. J. Chabai. Rept. on Contract AT(29-1)789. 15 Mar 62, 30p. 23 refs. SCDC-2500.

Physics of the Atmosphere

UCRL-6792-T OTS $1.10

Lawrence Radiation Lab., U. of California, Livermore.
THE ELECTRON SPECTRUM FROM 80 TO 1258 KEV OBSERVED ON DISCOVERER SATELLITES 29 AND 31, by L. G. Mann, S. D. Bloom, and H. I. West, Jr. Rept. on Contract W7405-eng-48. 15 Feb 62, 4p.

Order from GPO $0.50 as
C 13.46:162

National Bureau of Standards, Boulder, Colo.
THERMAL BALANCE IN THE F REGION OF THE ATMOSPHERE, by Douglas C. Hunt. Sep 62, 87p. 45 refs. Technical note 162; NASA N63-12645.

DESCRIPTORS: *Atmosphere, *Ionosphere, *Thermal radiation, Solar radiation, Atmospheric temperature, Atmosphere models, Partial differential equations, Thermodynamics.

An investigation is made of thermal mechanisms and detailed properties of the atmosphere at F-region heights. The method used constructs a thermal model of the atmospheric F region based on experimental data combined with theoretical results and arguments. The heat balance equation for this model is simultaneously solved with the barometric equation. The resultant mass density profiles are then compared with observed mass density profiles to determine how much heating by some external source is necessary in the F-region.

ENGINEERING

PB 162 873 OTS $8.10

Stanford U., Calif.
OBLIQUE FLOW LOSSES IN SCREEN MATRIX HEAT EXCHANGERS, by W. H. Comtois. Technical rept. no. 29 on Contract Nonr-225(23). June 56, 86p. 23 refs. AD-103 390.

DESCRIPTORS: *Heat exchangers, *Wire screens, Fluid flow, *Guide vanes, Diffusers, Duct bends, Nozzles, Smokes, Heat transfer.

The flow stream mechanical energy losses and flow maldistributions at oblique flow angles which adversely affect thermal performance were studied and means are suggested for reducing them Empirical data are presented from experiments on oblique inflow and outflow (between plane parallel walls) to a screen matrix set at 80°, 75.5°, 70.5°, and 60° to the supply and discharge ducts. The angles which the ducts made with the matrix were equal in each case. Smoke was introduced into the flow stream. The visible flow patterns were used to help explain the mechanisms involved. Smoke traces were used as a guide in designing guide vanes. Results indicate that guide vanes in the downstream duct can reduce but not eliminate the losses. The major source of loss is the increased length of the flow path through the matrix and the high velocities in the first few layers where the flow is turned. To eliminate this source the flow may first be turned before it enters the matrix by (1) redesigning the entrance duct or (2) installing a large number of closely spaced vanes immediately before the core. An analysis shows the adverse effect on the heat-transfer performance which results from the flow maldistribution caused by the use of oblique heat-exchanger cores. (ASTIA abstract)

Aeronautical Engineering

NASA N63-12646 OTS $3.00

Langley Research Center, National Aeronautics and Space Administration, Langley [Station] Va.
PRESSURE DISTRIBUTION OF A 0.0667-SCALE MODEL OF THE X-15 AIRPLANE FOR AN ANGLE-OF-ATTACK RANGE OF 0° TO 28° AT MACH NUMBERS OF 2.30, 2.88, AND 4.65, by B. Leon Hodge and Paige B. Burbank. May 60, declassified 5 June 62. 161p. 5 refs. Technical memo. X-275.

NASA N63-12520 OTS $1.25

Langley [Research Center, National Aeronautics and Space Administration] Langley [Station] Va.
SIMULATED FLIGHT INVESTIGATION OF SCALED-SPEED ELASTIC SWEPT-WING BOMBER AND FIGHTER MODELS COUPLED WING TIP TO WING TIP, by Robert F. Thompson. 14 Feb 56, declassified 17 July 62. 44p. 6 refs. Research memo. RM L55J24.

NASA N63-12525 OTS $0.75

Lewis [Research Center, National Aeronautics and Space Administration] Cleveland, Ohio.
EFFECTS OF SECONDARY-AIR FLOW ON ANNULAR BASE FORCE OF A SUPERSONIC AIRPLANE, by Donald J. Vargo. 11 Oct 54, declassified 17 July 62. 29p. 8 refs. Research memo. RM E54G28.

NASA N63-12508 OTS $1.25

Lewis [Research Center, National Aeronautics and Space Administration] Cleveland, Ohio.
PERFORMANCE CHARACTERISTICS OF SEVERAL DIVERGENT-SHROUD AIRCRAFT EJECTORS, by William K. Greathouse and William T. Beale. 8 Sep 55, declassified 17 July 62. 46p. 24 refs. Research memo. RM E55G21a.

NASA N63-12526 OTS $0.75

Lewis [Research Center, National Aeronautics and Space Administration] Cleveland, Ohio.
PUMPING CHARACTERISTICS FOR SEVERAL SIMULATED VARIABLE-GEOMETRY EJECTORS WITH HOT AND COLD PRIMARY FLOW, by John L. Allen. 8 Sep 54, declassified 17 July 62. 26p. 11 refs. Research memo. RM E54G15.

Chemical Engineering

UCRL-10394 OTS $1.75

Lawrence Radiation Lab., U. of California, Berkeley.
LONGITUDINAL MIXING IN PACKED GAS-ABSORPTION COLUMNS, by William E. Dunn, Theodore Vermeulen and others. Rept. on Contract W7405-eng-48. 31 July 62, 67p. 13 refs.

NLCO-852 OTS $0.50

National Lead Co. of Ohio, Cincinnati.
ROLE OF HYDROXIDE ION DURING STRIPPING OF URANIUM FROM TRI-n-BUTYL PHOSPHATE - KEROSENE SOLVENT INTO WATER, by T. J. Collopy and R. K. Klopfenstein. Rept. on Contract AT(30-1)1156. 28 Dec 62, 19p. 5 refs.

PB 162 884 OTS $3.60

Naval Radiological Defense Lab., San Francisco, Calif.
DESIGN AND PERFORMANCE OF A PLASTIC-LINED ULTRAFILTER, by C. M. Callahan and J. R. Lai. 8 July 60, 39p. 11 refs. Rept. no. TR-492; AD-250 812.

DESCRIPTORS: Radioactive isotopes, Design, Radioactive fall-out, Colloids, Plastics, Separation, Membranes, Sea water, Tests, Materials, *Laboratory equipment, *Water filters.

A lucite-lined high-pressure ultrafilter was designed and tested for use with corrosive inorganic solutions. The design and the construction materials used were such that solution-metal interfaces were eliminated in the apparatus. Of three commercial dialyzing membranes investigated, the filtering characteristics of two were satisfactory for separating colloidal materials. Filtration of distilled water, hydrochloric acid and several salt solutions, to determine whether filtration rate and solute concentration are constant, showed that the rate of filtration became a maximum early and then slowly decreased. Filtrations with radioactive tracers were also made to determine the extent of adsorption on the components of the apparatus. These experiments verified the screening effect in addition to showing that adsorption could be a very serious problem. Methods for minimizing adsorption were devised, especially for working with seawater media. Tests were made with the radiocolloids Zr-95-Nb-95 to show that radiocolloids were effectively separated by ultrafiltration. (Author)

PB 162 893 OTS $1.60

Texas U., Austin.
A FLOW REACTOR FOR KINETIC STUDIES, by J. R. Streetman and F. A. Matsen. Technical note no. 18 on Contract AF 18(600)430. May 55, 15p. 1 ref. OSR-TN-55-125; AD-63 363.

DESCRIPTORS: *Towers (Chemistry), Reactors, Design, *Acetylenes, Reaction kinetics.

A new flow reactor has been constructed for study of the kinetics of thermal reactions in acetylene and oxy-acetylene systems. This provides temperature and flow control and permits observation of effects of addition of various diluents and reagents. In order to have the information available for reference in connection with reports on a series of investigations now in progress, a detailed description of the construction and calibration of the unit is given in this report. (Author)

Electrical and Electronic Engineering

AD-274 787 OTS $1.60

Air Force Cambridge Research Labs., Bedford, Mass.
A CERAMIC GRID FOR HIGH POWER ELECTRON TUBES, by A. Matthewson. Nov 61, 20p. 6 refs. AFCRL 961.

DESCRIPTORS: *Electron tubes, *Electrodes, *Thermionic emission, Vacuum systems, High temperature research, Refractory materials, Ceramic materials, Titanium compounds, Oxides, Design, Tests, Materials, Electron tube parts.

This paper summarizes the problem of grid emission in high power electron tubes, its cause and effect, inclusive of materials investigated by this laboratory. Indicating the lack of satisfactory materials for grids, the study describes titanium dioxide (TiO_2) as one material that can be used effectively. (Author)

PB 162 853 OTS $28.50

Armour Research Foundation, Chicago, Ill.
PROCEEDINGS OF THE CONFERENCE ON RADIO INTERFERENCE REDUCTION AND ELECTRONIC COMPATIBILITY [NO. 6] HELD AT THE MUSEUM OF SCIENCE AND INDUSTRY, CHICAGO, ILLINOIS OCTOBER 4-6, 1960. Oct 60, 727p. 113 refs.

DESCRIPTORS: *Conferences, *Radio interference, Reduction, *Electronic equipment, *Compatibility, Electromagnetic shielding.

Contents:
Missile and space considerations
Antenna measurement seminar
Systems
Shielding I
Prediction methods

Instrumentation
Spurious emissions I
Susceptibility
See also PB 148 074

PB 162 998 OTS $5.60

Burroughs Corp., [Philadelphia] Pa.
DEVELOPMENT AND CONSTRUCTION OF A FUNCTIONAL TEST MODEL TELETYPEWRITER SET AN/FGC-36 ( ), by I. Glassman. Quarterly progress rept. no. 1, 15 June-15 Sep 57, on Contract DA 36-039-sc-74840. [1957] 60p. 6 refs. Rept. no. TR-57-40; AD-149 642.

DESCRIPTORS: *Teletype systems, *Communication systems, Teletype equipment, Electronics, *Electronic recording systems, Circuits, Mechanical engineering, Engineering personnel, Design, Construction, Model tests.

Progress is reported for work accomplished on the following phases: (I) Electrographic Recording technique- a plastic model has been fabricated to investigate feasibility of attaining good inking compatible with specification on line visibility; good inking is attainable. A second model will approximate the actual teletypewriter configuration. Experimentation and study on eliminating a controlled atmosphere (II) Electronics - conversion of start-stop signal to five bit parallel code using solid state techniques is under way using an electronic analog of mechanical distributor, with definite advantages over the pulsed oscillator scheme used in existent electronic distributors. (III) Mechanical - has been concerned with the paper advance mechanism and paper feed - To meet requirements of visibility of printed copy, a combined paper feed and calendering station has been initiated - efforts towards LUCIPO have been concentrated in the design of printing heads. A study of three keyboards has been made. (Author)

PB 162 867 OTS $12.50

[Carlyle Barton] Lab., Johns Hopkins U., Baltimore, Md.
SIGNAL DETECTION BY ADAPTIVE FILTERS, by E. M. Glaser. Rept. on Contract AF 33(616)6753. Apr 60, 175p. 18 refs. Technical rept. no. AF-75; AD-235 315.

DESCRIPTORS: *Radio signals, Detection, *Signal-to-noise ratio, *Radio-frequency filters, Statistical analysis, Analog computers, Digital computers, Simulation, Theory, Radiofrequency pulses, Tests.

A system is described which is capable of adapting and optimizing its response to the class of pulse signals whose individual pulses are less than T seconds in duration. The analysis and synthesis of the adaptive system is facilitated by the use of an orthogonal function decomposition of the received signal. The use of the orthogonal decomposition permits synthesis of optimum linear filters by various circuit techniques. The structure of the system utilizing such a decomposition is described in detail. Since the operation of the adaptive filter is based upon signal detection and estimation in noise backgrounds, considerable attention is devoted to the relationship between optimum signal detection and estimation. The methods of statistical decision theory are used. A program to test the validity of the approximations and assess the overall system performance was carried out by simulation of the system on both analog and digital computers. The results of these experimental runs are described. (Author)

PB 162 926 OTS $12.50

Clevite Corp., Cleveland, Ohio.
PIEZOELECTRIC CERAMIC FILTERS AND TRANSDUCERS, by D. R. Curran and F. Kulcsar. Final rept. 1 June 58-29 Feb 60, on Contract DA 36-039-sc-78039. 15 Mar 60, 171p. 1 ref. AD-236 503.

DESCRIPTORS: *Intermediate frequency filters, *Piezoelectric transducers, *Ceramic materials, Design.

Transformers have been designed for use with ceramic ladder filters, and the previously developed cylindrical filter package has been modified to facilitate assembly and increase reliability. The frequency range for ceramic ladder filters has been extended using fundamental and first overtone radial resonators. A 1 mc fundamental mode ladder filter has been developed and packaged in the Micro-Module configuration, with a 9 resonator filter occupying 0.02 cubic inch. Sources of spurious responses in 4.3 mc thickness resonators have been investigated, and several methods devised to suppress them. A series of ceramic composition studies culminated in the development of a stable filter ceramic with over twice the mechanical Q and half the dielectric constant of that previously available. This ceramic has been used to give ladder filters with extremely steep skirts and with pass bands as narrow as 1/2%.

NASA N63-11334 OTS $1.60

Electro-Optical Systems, Inc., Pasadena, Calif.
FEASIBILITY STUDY TOWARD DEVELOPMENT OF RADIATION RESISTANT SOLAR CELL, by S. Kaye. Monthly rept. 1-31 July 62, on Contract NAS7-92. 15 Aug 62, 17p. EOS rept. 2080-ML-9.

PB 162 819 OTS $4.60

Electron Tube Research Lab., U. of Minnesota, Minneapolis.
DIFFUSION AND INTERFACE STUDIES ON CATHODE SLEEVE NICKEL, by W. G. Shepherd. Quarterly rept. no. 5, 9 Jan-9 Apr 54, on Contract NObsr-63172. [1954] 45p. 3 refs.

DESCRIPTORS: *Cathodes, *Oxide cathodes, *Nickel alloys, *Aluminum alloys, *Titanium alloys, *Diffusion, Coatings, *Strontium, Thermionic emission.

Diffusion coefficients have been obtained for aluminum and titanium in nickel. The results can be described by the equations:

$$D_{Al} = 1.87 \exp - 64,000/RT \text{ cm}^2/\text{sec.}$$
$$D_{Ti} = 0.86 \exp - 61,400/RT \text{ cm}^2/\text{sec.}$$

Experiments are described which has the objective of determining whether the Sr evolution was influenced by drawing current from an oxide cathode based on pure nickel. (See also PB 162 818)

PB 162 820 OTS $3.60

Electron Tube Research Lab., U. of Minnesota, Minneapolis.
DIFFUSION AND INTERFACE STUDIES ON CATHODE SLEEVE NICKEL, by W. G. Shepherd. Quarterly rept. no. 6, 9 Apr-9 July 54, on Contract NObsr-63172. [1954] 35p. 6 refs.

DESCRIPTORS: *Cathodes, *Oxide cathodes, *Nickel alloys, *Tungsten alloys, *Titanium alloys, *Manganese alloys, Spectrographic analysis, *Diffusion, Coatings, *Strontium, *Barium, Thermionic emission.

A discussion is given of some of the problems which arise in diffusion studies of a low solubility solute element when an intermetallic compound or other insoluble compounds may occur on grain boundaries. A spectrophotometric technique for the analysis of tungsten in nickel is described. Re-evaluation of the diffusion data for manganese in nickel yields

$$D_{Mn} = 7.50 \exp -(67,100/RT)\ cm^2/sec.$$

A study has been completed on several carbon backed nickel cathodes in which observations of the Sr evolution and thermionic emission were made as functions of time. (See also PB 162 819)

PB 162 821 OTS $4.60

Electron Tube Research Lab., U. of Minnesota, Minneapolis.
DIFFUSION AND INTERFACE STUDIES ON CATHODE SLEEVE NICKEL, by W. G. Shepherd. Quarterly rept. no. 7, 9 July-9 Oct 54, on Contract NObsr-63172 [1954] 49p. 10 refs.

DESCRIPTORS: *Cathodes, *Oxide cathodes, *Nickel alloys, *Carbon alloys, Silicon alloys, *Aluminum alloys, Spectrographic analysis, *Diffusion, *Alkaline earth compounds, Oxides, *Strontium, *Barium, Thermionic emission, Coatings.

A modification of a spectro-photometric method for the determination of Si in steel has been found to be applicable to the determination of Si in nickel. Solutions are given for the diffusion equation for several sets of boundary conditions encountered in cathode problems. Results obtained for Al-Ni alloy bases fabricated into diffusion couples by plating of pure nickel onto the alloy are reported. The activation energy for evaporation of alkaline earth oxides has been calculated on the assumption that ionic diatomic molecules are formed. The activation energy for the formation of ion vacancies in the alkaline earth oxides has been calculated. (See also PB 162 820)

PB 162 822 OTS $4.60

Electron Tube Research Lab., U. of Minnesota, Minneapolis.
DIFFUSION AND INTERFACE STUDIES ON CATHODE SLEEVE NICKEL, by W. G. Shepherd. Quarterly rept. no. 8, 9 Oct 54-9 Jan 55, on Contract NObsr-63172. [1955] 49p. 5 refs.

DESCRIPTORS: *Cathodes, *Oxide cathodes, *Nickel alloys, *Carbon alloys, *Aluminum alloys, *Manganese alloys, *Silicon alloys, *Diffusion, Coatings, *Strontium, *Thermionic emission, Grain structures (Metallurgy), Resistance.

The problem of producing a Mg-Ni alloy is discussed for the case in which a particular concentration of Mg is desired and foreign deoxidizing agents may not be employed. The measurement of pulse emission current and strontium evolution during life are described for oxide cathodes based on 0.22% Al-Ni alloy, with and without a pure nickel plating, and on Mn-Ni alloy without the plating. The value of the strontium evolution rate at maximum pulse emission current is noted to be approximately 2×10^{-11} gms/cm^2/sec for both the Al-Ni and Mn-Ni based cathodes. (See also PB 162 821)

PB 162 823 OTS $6.60

Electron Tube Research Lab., U. of Minnesota, Minneapolis.
DIFFUSION AND INTERFACE STUDIES ON CATHODE SLEEVE NICKEL, by W. G. Shepherd. Quarterly rept. no. 9, 9 Jan-9 Apr 55, on Contract NObsr-63172. [1955] 63p. 3 refs.

DESCRIPTORS: *Cathodes, *Oxide cathodes, *Nickel alloys, *Magnesium alloys, *Silicon alloys, *Molybdenum alloys, Spectrographic analysis, Aluminum alloys, Manganese alloys, Tungsten alloys, Impurities, Carbon, Coatings, *Strontium, Thermionic emission, Grain structures (Metallurgy), *Diffusion.

Additional measurements of the diffusion coefficient for magnesium in nickel have provided data which give the temperature dependence of the diffusion coefficient as

$$D = .24 \exp(-55,000/RT) cm^2/sec$$

The diffusion coefficient of silicon in nickel has been measured at two temperatures, leading to preliminary values for the constants in the temperature dependence relationship as given below:

$$D = .56 \exp(-58,500/RT) cm^2/sec.$$

Measurements of the strontium evolution and pulse emission current are presented for cathodes based on carbon-doped nickel and on single additive nickel alloys with Al, Mn and W. (See also PB 162 822)

PB 162 824 OTS $7.60

Electron Tube Research Lab., U. of Minnesota, Minneapolis.
DIFFUSION AND INTERFACE STUDIES ON CATHODE SLEEVE NICKEL, by W. G. Shepherd. Quarterly rept. no. 10, 9 Apr-9 July 55, on Contract NObsr-63172. [1955] 74p. 7 refs.

DESCRIPTORS: *Cathodes, *Oxide cathodes, *Nickel alloys, *Magnesium alloys, *Silicon alloys, *Molybdenum alloys, *Diffusion, Spectrographic analysis, Impurities, Carbon, Thermionic emission, Coatings, *Barium compounds, *Strontium compounds, Carbonates, Electrodeposition, Grain structures (Metallurgy), Resistance.

The results of the final measurements of the diffusion of reducing agents in nickel are presented. The equations for the temperature dependence of the diffusion coefficients for magnesium, silicon and molybdenum in nickel are, respectively,

$$D^{Mg} = 0.44 \exp(-56,600/RT) \text{ cm}^2/\text{sec.}$$

$$D^{Si} = 1.5 \exp(-61,700/RT)$$

$$D^{Mo} = 3.0 \exp(-68,900/RT)$$

The strontium evolution and pulse emission current have been measured for cathodes based on carbon-doped nickel and on single additive nickel alloys. A modification of the theoretical analysis of chemical activation based on ideas of surface adsorption is discussed in detail. (See also PB 162 823)

PB 162 825 OTS $5.60

Electron Tube Research Lab., U. of Minnesota, Minneapolis.
DIFFUSION AND INTERFACE STUDIES ON CATHODE SLEEVE NICKEL, by W. G. Shepherd. Quarterly rept. no. 11, 9 July-1 Oct 55, on Contract NObsr-63172. [1955] 58p. 2 refs.

DESCRIPTORS: *Cathodes, *Oxide cathodes, *Nickel alloys, *Titanium alloys, *Magnesium alloys, *Molybdenum alloys, *Diffusion, Impurities, Carbon, Coatings, Thermionic emission, *Barium compounds, *Strontium compounds, Carbonates, Electrodeposition, Grain structures (Metallurgy), Resistance.

Further results are presented for life characteristics of oxide cathodes using carbon as the reducing agent. Measurements of cathodes based on a titanium-nickel alloy suggest that the reduction of the coating is limited by the reaction rate of titanium with the alkaline earth oxides rather than a diffusion limitation. Cathodes based on this alloy show a high stable emission. Results are given which show that drawing current during life from cathodes based on a tungsten nickel profoundly influences the thermionic emission. (See also PB 162 824)

PB 162 826 OTS $6.60

Electron Tube Research Lab., U. of Minnesota, Minneapolis.
DIFFUSION AND INTERFACE STUDIES ON CATHODE SLEEVE NICKEL, by W. G. Shepherd. Quarterly rept. no. 12, 1 Oct 55-1 Jan 56, on Contract NObsr-63172. [1956] 63p.

DESCRIPTORS: *Cathodes, *Oxide cathodes, *Nickel alloys, *Titanium alloys, *Magnesium alloys, *Aluminum alloys, *Diffusion, Impurities, Carbon, Coatings, Thermionic emission, *Barium compounds, *Strontium compounds, Carbonates, Electrodeposition, Grain structures (Metallurgy), Resistance.

Preliminary investigations of the CO evolution from carbon-backed oxide cathodes show that the omegatron-type mass spectrometer can be used to correlate CO evolution with Sr evolution. Cathodes based on a titanium-nickel alloy exhibit a limiting rate of Sr evolution for the early part of life, decreasing later in life as the titanium concentration decreases apparently forcing a diffusion limited rate of reaction. These cathodes exhibit a high stable emission. Comparison of the behavior of cathode coatings electro-deposited from an acetate solution with the behavior of coatings deposited in binder have shown significant differences. Interface studies show definite resistive interface development for 0.1% Si-Ni alloy bases. (See also PB 162 825)

PB 162 827 OTS $5.60

Electron Tube Research Lab., U. of Minnesota, Minneapolis.
DIFFUSION AND INTERFACE STUDIES ON CATHODE SLEEVE NICKEL, by W. G. Shepherd. Quarterly rept. no. 13, 1 Jan -1 Apr 56, on Contract NObsr-63172. [1956] 58p. 5 refs.

DESCRIPTORS: *Cathodes, *Oxide cathodes, Nickel alloys, *Titanium alloys, *Magnesium alloys, *Diffusion, Impurities, Carbon, Coatings, Thermionic emission, *Barium compounds, *Strontium compounds, Carbonates, Electrodeposition, Grain structures (Metallurgy), Resistance.

Simultaneous measurements of the evolution of CO and Sr from an oxide coating based on carbon-backed nickel have shown that the reaction,

$$SrO + C \rightarrow Sr + CO,$$

takes place in preference to the reaction,

$$SrO + 3C \longrightarrow SrC_2 + CO.$$

Cathodes based on a 1% Ti-Ni alloy exhibit a high stable emission for at least two hundred hours. Further studies on the technique for electrodeposition of mixed alkaline earth carbonates from an acetate bath have shown that a pH of from 5.5 to 5.7 results in uniform coatings. Interface studies have shown that cathodes based on 1% Ti-Ni and 0.2% Mg-Ni alloys developed measurable resistance at 6000 hours of life. The interface resistances measured for cathodes based on .22% Al, 1% Mn, 1% Mo and 1% W have been found to be small after 6000 hours of quiescent operation at 800°C brightness. (See also PB 162 826)

Order from GPO $6.00 as
D 211.6/2:E12/6

Federal Electric Corp., Paramus, N. J.
MAINTAINABILITY DESIGN CRITERIA HANDBOOK FOR DESIGNERS OF SHIPBOARD ELECTRONIC EQUIPMENT. Rept. on Contract NObsr-81149. Apr 62, 488p. 68 refs. NAVSHIPS 94324.

DESCRIPTORS: *Handbooks, *Maintenance, *Electronic equipment, Shipborne, Design, Maintenance personnel, Maintenance equipment, Test equipment, Control systems, Containers, Electric connectors, Microminiaturization, *Marine engineering, Electric cables.

Maintainability design for electronic equipment is that part of the equipment design which contributes to the rapidity, economy, ease, and accuracy of maintenance. The first part of the handbook discusses the maintainability concept. The second part presents a brief description of shipboard physical environment and a sum-
(Engineering--Electronic, 5 June 63) (over)

mary of maintenance personnel qualifications. Maintainability design criteria relating to equipment packaging, modularization and micro-miniaturization, testing, displays and controls, cables and connectors, and other design considerations are presented in the remaining six parts of the handbook.

NASA N63-11342 OTS $1.60

Inland Testing Labs., Dayton, Ohio.
IMPROVEMENT OF NICKEL-CADMIUM BATTERIES, by I. F. Luke. Monthly technical progress rept. no. 16, 20 July-20 Aug 62, on Contract NAS5-1048. 22 Aug 62, 14p.

PB 162 894 OTS $11.50

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
STUDY OF NEGATIVE IMPEDANCE TELEPHONE REPEATER USING TRANSISTORS, by M. A. Treuhaft. Final rept. on Contract DA 36-039-sc-42525. 4 June 54, 153p. 19 refs. Rept. no R-380-54; PIB-314; AD-41 216.

DESCRIPTORS: *Telephone repeaters, Design, *Impedance, Electronic circuits, *Transistors, Electrical properties, Analog systems, Indicator lights

Junction transistors appeared preferable to point-contac transistors for use in negative-impedance repeaters. The junction transistors had superior temperature properties, better linearity, and better stability. Two class-B negative-impedance repeaters, the complementary symmetry repeater and the double 111-C repeater, have low distortion and adequate gain over the frequency band (300 to 3000 c); they have a low stand-by-on-the batteries drain, a high peak output power, and a high efficiency. A systematic synthesis technique involving the use of an analog computer was developed to compensate for transformer inadequacies. The most effective surge-protection device was a small neon bulb wired from emitter to emitter in the repeater. A current feed method was preferred to that of the shunt feed. Basic design procedures were developed whereby standard sections containing a repeater could be made unconditionally stable.

PB 162 915 OTS $1.60

Naval Ordnance Lab., White Oak, Md.
A SPARK LIGHT SOURCE AND TRIGGER, by W. T. Whelan and D. E. Allmand. 8 Dec 49, 12p. 1 ref. Rept. no. NOLM 10622.

DESCRIPTORS: *Light, Sources, *Sparks, Electric discharges, Trigger circuits, Electromagnetic pulses, Transformers (Electronics), Synchronization (Electronics), Light pulses.

A double-gap spark source is described which was found to give more reliable performance than had previously been experienced with single-gap sources. To decrease the fluctuation in ignition time, a special trigger transformer was constructed. (Author)

PB 162 951 OTS $21.00

RCA Defense Electronic Products, Moorestown, N. J.
INSTRUMENTATION RADAR AN/FPS-16(XN-16(XN-2), by Arthur J. Mills. Final rept. on Contract NOas 55-869-c. [1959] 360p. 28 refs. AD-250 500.

DESCRIPTORS: *Radar tracking, Radar equipment, *Radar ranges, Instrumentation, Test facilities, Guided missiles, Surface to air, Design, Digital systems, Coding, X-band, *Guided missile tracking systems.

Research covers the evolution, design, and fabrication of two AN/FPS-16(XN-2) Instrumentation Radar Sets; and the installation of one on the Grand Bahama Islands. This radar performs a valuable function in the Atlantic Missile Range program. The other radar set was retained at RCA, Moorestown, N. J. for utilization in the XN-3 modification program. (Author)

PB 162 880 OTS $4.60

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
THE THERMIONIC ENERGY CONVERTER, by W. B. Nottingham. [Rept. on Contract DA 36-039-sc-78108]. 9 Sep 60, 50p. 11 refs. Technical rept. 373; AD-246 120.

DESCRIPTORS: Thermionic emission, Cesium; Energy, Diodes, Cathodes; *Cesium electron tubes, Theory, *Plasma physics, *Engery conversion, Thermionic converters.

Contents:
General theory of the plasma diode energy converter
A simplified method for the computation of electrical properties of a closed-space thermionic converter
The thermionic diode as a heat-to-electrical-power transducer

AD-276 590 OTS $1.60

Rome Air Development Center, Griffiss AFB, N. Y.
ANTENNA CONTOUR CHECK BY TRIANGULATION, by Blase J. Chiarello. May 62, 16p. RADC-TDR-62-18; NASA N62-13168.

DESCRIPTORS: *Radar antennas, Test methods, *Parabolic antennas, *Antennas, Design, *Triangulation, Trinidad, Tests, Measurement, Errors, Theodolites, Test equipment.

This report describes the triangulation method used to check the contour of the RADC Torus Antenna located in Trinidad, WIF. Observations and line measurements were made using first order survey methods and equipment. Contour errors were determined relative to an X, Y, Z Plane Coordinate System in which the vertex of the antenna paraboloid was used as the origin. Twenty antenna points were measured and the distances from these points to the torus focal point were computed. These distances were compared with design distances which were calculated from survey Y-values and parabolic formulas. This method is based on the assumption that the antenna, because of the nature of its construction and the fact that it was tilted above the X-Z plane, as determined by spirit levels, was distorted and in error chiefly in the X-direction. The point errors ranged from 0.040 inches to 1.10 inches. The tilt angle was found to be 07°, 58', 30". (Author)

TID-16571 OTS $1.60

Sandia Corp., Albuquerque, N. Mex.
A DIRECT READING VOLTAGE DIVIDER WITH STANDARD CELL REFERENCE, by R. P. McKnight. Rept. on Contract AT(29-1)789. 17 Aug 62, 19p. SCDC-2609.

SCTM-374-61(14) OTS $7.60

Sandia Corp., Albuquerque, N. Mex.
A PRELIMINARY INVESTIGATION OF FIELD-EFFECT TRANSISTORS, by W. H. Dodson. Rept. on Contract AT(29-1)789. Sep 61, 78p.

PB 158 595 OTS $7.60

Stanford Electronics Labs., Stanford U., Calif.
SOLID-STATE ELECTRONICS RESEARCH. Consolidated quarterly status rept. no. 9, 1 Oct-31 Dec 60, on Contracts Nonr-225 (31), Nonr-225 (44), Nonr-225 (24), DA 36-039-sc-85339, DA 36-039-sc-73178, DA 36-039-sc-78296, AF 33 (616) 6207, AF 49 (638) 660, and DA 04-200-ORD-1087. [1961] 74p. 15 refs. AD-251 812.

DESCRIPTORS: *Scientific research, Circuits, Electronics, *Electronic equipment, Solids, Electron tubes, Semiconductors, *Transistors, Thermoelectricity, *Switching circuits, Silicon, Masers, Transmission lines, Reliability, Delay lines, Electrons, Phonons.

Contents:
Neuristor studies; Models of thermoelectric devices; Reliable microsystems; Neuristor realization; Photoconductivity-electroluminescence; Improvement of reliability by redundancy and adaption; Adaptive switching circuits; Memistor research; Switching type regulators; Miscellaneous short term activities; Variable delay lines for phase modulation; A study of nonlinear distortion; A study of field switching devices; Studies of breakdown in silicon; Triggering in avalanche transistors; Study of hot electrons in silicon; Silicon oxide capacitors; Neuristor device study; Experimental noise studies; Thin-film siliconcarbide devices; Solid-state microwave amplifying and generating devices; Large-signal analysis of nonlinear transmission lines; Properties of small contacts to semiconductors; Electron and phonon behavior in solids; High level injection studies; High-speed high-current switching devices; Diffusion of impurities in III-V compound semiconductors; Adaptive elements; Broadband maser amplifiers; Theoretical studies of solid-state masers; CW optical maser development; Parametric amplifiers; Ferrimagnetic filters and resonators.

PB 162 950 OTS $12.00

[Stanford Electronics Labs.] Stanford U., Calif.
STUDY OF PERIODIC STRUCTURES FOR HIGH-VOLTAGE TRAVELING-WAVE-TUBE OPERATION, by Robert A. Craig. Technical rept. no. 36 on Contract N6onr-25132. 2 Nov 54, 164p. 16 refs. AD-50 157.

DESCRIPTORS: *Traveling wave tubes, Circuits, Design, Electric potential, *Waveguides, Impedance, Resonators, Cavity resonators.

Research is reported on a search for a slow-wave structure to be used as a traveling-wave tube with a 10% or greater usable bandwidth at a beam voltage of about 100 kv. Discussions are given of space-harmonic coaxial structures which include the Hines structure and the capacitively coupled $\lambda/2$ coaxial resonators with both parallel and crossed resonator bars. Ordinary space-harmonic structures are treated as crossed-bar resonators without windows. The higher-order coaxial mode (TE_{11}) is discussed for fundamental structures, and the TEM mode coaxial resonators, inductively coupled for fundamental operation, are described. Negative-mutual-inductance coupled structures which are designed for fundamental operation are also analyzed. The hour-glass and the clover-leaf structures showed considerable promise. (ASTIA abstract)

PB 162 898 OTS $1.60

Suchy Div., Inc., New York.
DEVELOPMENT OF PILOT BALLOON TARGET, by D. J. McAuley. Final rept. Apr 52-Feb 53, on Contract DA 36-039-sc-15550. [1953] 15p. AD-15 026.

DESCRIPTORS: *Radar targets, *Radar reflectors, *Balloons, Design, Production.

A description is given of the development and production of a radar balloon target of reflector which was produced in accordance with technical requirement no. SCL-2545. The reflector consists of a circular plane on each side of which are 2 intersecting semi-circular wings at right angles to the circular plane. The opposite pairs of wings are 45° out of phase. Reflecting planes of 3-cm Sucal radar mesh are stretched over a fluted steel section framework. The minimum weight compatible with well-tensioned planes and accurate right angles is 14 oz. The reflector can be erected by 1 person wearing heavy gloves in less than 1 min. (ASTIA abstract)

AD-287 665 OTS $2.60

TYCO Labs., Inc., Waltham, Mass.
ELECTROCHEMISTRY OF FUEL CELL ELECTRODES, by A. C. Makrides. Semiannual technical rept. no. 1 on Contract Nonr-3765(00). 30 Oct 62, 27p. ARPA Order no. 302-62.

DESCRIPTORS: *Fuel cells, *Power supplies, Intermetallic compounds, Hydrogen, Oxygen, Oxidation, Reduction, Ethylenes, Nickel alloys, Silicides, Arsenides, Antimony alloys, Antimonides, Solutions, Nickel electrodes, Alloys, Gold alloys, Palladium alloys, Platinum alloys, Silver alloys, Catalysis, Electrolytes, Electric potential, *Electrodes, *Electrochemistry.

The objective of the present research is the correlation of the polarization characteristics of electrodes with their electrocatalytic activity towards reactions which are of interest in fuel cell systems. Hydrogen oxidation, ethylene oxidation, and oxygen reduction have been selected as the reactions to be studied. The catalytic activity of nickel and its intermetallic compounds with Si, As, Sb and S for the hydrogen and oxygen reactions has been established in both alkaline and acid solutions. Potentiostatic techniques were used

in these measurements. In a separate study, the hydrogen reaction (both oxidation and reduction) on nickel in alkaline solution was examined in detail. In another series of measurements, alloys of Pd with Ag and Au, and of Pt with Au were prepared and initial measurements for the hydrogen and oxygen reactions were made. Finally, studies of ethylene oxidation on Pt were begun.

PB 162 889 OTS $1.60

Vitro Labs., Silver Spring, Md.
ELECTRON TUBE TEMPERATURE PROBLEM IN RELATION TO DESIGN FOR RELIABILITY, by D. E. Brown and R. W. Rowland. Rept. on Contract DA 36-034-sc-1426. 30 Nov 53, 16p. Technical rept. no. 51.

DESCRIPTORS: *Electron tubes, Temperature, Design, *Reliability (Electronics), Electronic equipment, Military requirements, Guided missiles.

Existing military specifications are inadequate with regard to high temperature operation of electron tubes, and few quantitative test results are available in this field. Poor design of electronic equipment and decreased performance thereof are attributable in part to these inadequacies. A tube testing program could establish the relation between tube reliability and temperature, thus enabling appropriate revision of the tube specification. Improved electron tube shield designs should be evolved. Specifications for military electronic equipment should require a complete temperature analysis at the prototype stage. (Author)

Ordnance, Missiles, and Satellite Vehicles

NASA N63-11132 OTS $0.50

Ames Research Center, National Aeronautics and Space Administration, Moffett Field, Calif.
FREE-FLIGHT MEASUREMENTS OF DRAG AND STATIC STABILITY FOR A BLUNT-NOSED 10° HALF-ANGLE CONE AT MACH NUMBER 15, by Dale L. Compton. Apr 61, declassified 22 Aug 62. 18p. 6 refs. Technical memo. X-507.

NASA N63-13904 OTS $2.60

Ames Research Center, National Aeronautics and Space Administration, Moffett Field, Calif.
A WIND-TUNNEL INVESTIGATION AT SUBSONIC AND LOW SUPERSONIC SPEEDS OF A RE-ENTRY VEHICLE WITH RETRACTABLE WINGS, by Willard G. Smith. Feb 61, declassified 21p. 4 refs. Technical memo. TM-S-398.

PB 163 013 OTS $12.00

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
ANALYSIS OF MISSILE TRAJECTORY MEASUREMENT ACCURACY FOR DATA PROCESSING, by Thomas R. Benedict and George W. Bordner. Rept. on Contract AF 30(602)2138. Jan 61, 166p. 69 refs. Rept. no. GK-1409-P-1; RADC Technical rept. TR-61-41; AD-253 781.

DESCRIPTORS: *Guided missile trajectories, *Satellite vehicle trajectories, Analysis, Determination, *Orbital flight paths, *Data processing systems, Automatic, Computers, Mathematical analysis, Least squares method, Analysis of variance, Taylor's series, Vector analysis, Measurement, Perturbation theory, Mathematical prediction

An analysis is given of real-time missile trajectory data-processing, from the viewpoint of required computer capacity. Input information forms are analyzed for inherent accuracies and simplicity of automatic processing. Existing methods for both minimal-data orbit computations and data-smoothing are shown to exhibit great disparities in required computation times. These existing methods as well as a proposed MCL-ETS method are compared for accuracy and necessary arithmetic speeds. These analyses lead to the minimum computer-load (MCL-ETS) method which accepts noisy, equal-time-spaced, complete position fixes, performs the smoothing function on local-coordinate position and velocity vectors, and computes desired output quantities therefrom. Simulation results for this MCL-ETS method are described, along with the required data-processor characteristics. Results include the number of vehicles one may simultaneously track, as a function of computer capacity and measurement accuracies. (Author)

NASA N63-13901 OTS $3.60

Langley Research Center, National Aeronautics and Space Administration, Langley [Station] Va.
AERODYNAMIC HEATING TESTS OF MISSILE STABILIZERS IN A FREE JET AT MACH NUMBER 2, by Louis F. Vosteen, Sep 60, declassified, 34p. 2 refs. Technical memo. X-299.

NASA N63-13910 OTS $1.60

Langley Research Center, National Aeronautics and Space Administration, Langley [Station] Va.
EFFECT OF LONGITUDINAL AND LATERAL CONTROLS ON AERODYNAMIC CHARACTERISTICS OF A WINGED REENTRY CONFIGURATION AT A MACH NUMBER OF 1.97 AND ANGLES OF ATTACK UP TO APPROXIMATELY 90°, by Gerald V. Foster. Feb 61, declassified 1 Apr 63. 13p. 3 refs. Technical memo. X-449.

NASA N63-13907 OTS $6.60

Langley Research Center, National Aeronautics and Space Administration, Langley [Station] Va.
FREE-FLIGHT INVESTIGATION AT SUPERSONIC SPEEDS OF THE STABILITY AND DRAG OF A 79° CLIPPED DELTA BOOST-GLIDE CONFIGURATION INCLUDING AN ANALOG STUDY OF COUPLED MOTIONS DURING THE FLIGHT, by Sherwood Hoffman and Willard S. Blanchard, Jr. Jan 61, declassified 1 Apr 63. 61p. 19 refs. Technical memo. X-425.

NASA N63-13909 OTS $3.60

Langley Research Center, National Aeronautics and Space Administration, Langley [Station] Va.
AN INVESTIGATION AT SUBSONIC SPEEDS OF THE LONGITUDINAL AERODYNAMIC CHARACTERISTICS AT ANGLES OF ATTACK FROM -4° TO 100° OF DELTA-WING REENTRY CONFIGURATIONS HAVING VERTICALLY DISPLACED AND CAMBERED WING-TIP PANELS, by Bernard Spencer, Jr. Feb 61, declassified 1 Apr 63, 34p. 10 refs. Technical memo X-440.

NASA N63-13900 OTS $4.60

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
INVESTIGATION OF THE LOW-SUBSONIC STABILITY AND CONTROL CHARACTERISTICS OF A 1/3-SCALE FREE-FLYING MODEL OF A LIFTING-BODY REENTRY CONFIGURATION, by James L. Hassell, Jr. July 60, declassified, 41p. 5 refs. Technical memo. TM-X-297.

NASA N63-13902 OTS $1.60

Langley Research Center, National Aeronautics and Space Administration, Langley [Station] Va.
INVESTIGATION OF THE STATIC LONGITUDINAL STABILITY CHARACTERISTICS OF AN AIR-TO-SURFACE CANARD MISSILE CONFIGURATION IN THE TRANSONIC MACH NUMBER RANGE, by Gerald L. Hunt. Oct 60, declassified 20p. 1 ref. Technical memo. X-305.

NASA N63-13903 OTS $4.60

Langley Research Center, National Aeronautics and Space Administration, Langley [Station] Va.
SOME AERODYNAMIC AND CONTROL STUDIES OF LIFTING REENTRY CONFIGURATIONS AT ANGLES OF ATTACK UP TO 90° AT A MACH NUMBER OF 2.91, by Frank L. Clark and Joanna M. Evans. Nov 60, declassified 49p. 2 refs. Technical memo. X-338.

NASA N63-13906 OTS $2.60

Langley Research Center, National Aeronautics and Space Administration, Langley [Station] Va.
STATIC LONGITUDINAL AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A LENTICULAR-SHAPED REENTRY VEHICLE, by John P. Mugler, Jr., and Walter B. Olstad. Dec. 60, declassified 30p. 5 refs. Technical memo. TM X-423.

NASA N63-13908 OTS $1.60

Langley Research Center, National Aeronautics and Space Administration, Langley [Station] Va.
STATIC STABILITY AND CONTROL CHARACTERISTICS AT LOW-SUBSONIC SPEEDS OF A LENTICULAR REENTRY CONFIGURATION, by George M. Ware. Dec 60, declassified 1 Apr 63. 18p. 3 refs. Technical memo. X-431.

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NAS 1.12:128

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
STUDY OF AN AUTOMATIC SYSTEM FOR CONTROL OF THE TERMINAL PHASE OF SATELLITE RENDEZVOUS, by Edgar C. Lineberry, Jr. and Edwin C. Foudriat. 1962, 20p. 5 refs. NASA Technical rept. R-128; AD-269 902; NASA N63-11780.

DESCRIPTORS: Satellites (Artificial), *Rendezvous spacecraft, *Rendezvous guidance, Automatic, *Control systems, *Terminal guidance, Simulation, *Control simulators

An analytical and simulation study was conducted of an automatic system to control the terminal phase of rendezvous between two space vehicles. The system employs switching and thrust orientation criteria based upon relative-motion parameters first to establish a collision course and then to reduce the range and range rate to zero simultaneously. Techniques are developed for employing either modulated thrust or on-off thrust at a constant level. Results of the study indicate that the automatic system can effectively control rendezvous over a wide range of initial conditions and can utilize the available fuel in a very efficient manner. (Author)

Order from GPO $0.30 as
NAS 1.12:137

Langley Research Center, National Aeronuatics and Space Administration, Langley Station, Va.
USE OF AN INERTIA SPHERE TO DAMP THE ANGULAR MOTIONS OF SPINNING SPACE VEHICLES, by Jerrold H. Suddath. 1962, 15p. 6 refs. NASA Technical rept. R-137; NASA N63-10736.

DESCRIPTORS: *Satellites (Artificial), *Spin, *Stabilization systems, Gyro stabilizers, Control systems, Spheres, Inertia, Motion, Damping, Numerical analysis, Theory.

The general moment equations for a spin-stabilized vehicle with an inertia-reaction angular rate damper were considered, and it was noted that simplification would result if the damper had a spherical inertia distribution. A control system incorporating such a damper was postulated. The resulting equations were linearized, and conditions for stability were obtained from an analysis of the cubic characteristic equation. Two numerical examples were included. (Author)

NASA N63-12559 OTS $1.75

Langley Research Center, National Aeronautics and Space Administration, Langley [Station] Va.
WIND-TUNNEL INVESTIGATION AT MACH NUMBERS FROM 0.40 TO 1.20 OF THE STATIC AERODYNAMIC AND CONTROL CHARACTERISTICS OF A MODEL OF A NONLIFTING REENTRY CAPSULE IN COMBINATION WITH A ROCKET BOOSTER, by Albin O. Pearson. Sep 60, declassified 27 Sep 62. 69p. 2 refs. Technical memo. X-317.

NASA N63-12691 OTS $0.50

Lewis [Research Center, National Aeronautics and Space Administration] Cleveland, Ohio.
EXPERIMENTAL STUDY OF BALLISTIC-MISSILE BASE HEATING WITH OPERATING ROCKET, by J. Cary Nettles. 23 Sep 58, declassified 17 July 62. 11p. 1 ref. Research memo. RM E58G17.

Order from GPO $0.40 as
NAS 1.12:140

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
PERIGEE PROPULSION FOR ORBITAL LAUNCH OF NUCLEAR ROCKETS, by Paul G. Johnson and Frank E. Rom. 1962, 27p. 11 refs. NASA Technical rept R-140; NASA N63-11781.

DESCRIPTORS: Rockets, *Rocket propulsion, *Nuclear propulsion, *Thrust, Specific impulse, Rocket trajectories, Interplanetary trajectories.

A thrust program called perigee propulsion which minimizes gravity loss is analyzed. Thrust is applied intermittently in regions of high velocity (near successive perigees). The increased energy-addition efficiency yields mass ratios approaching those for impulsive velocity change. Corresponding times to reach desired energy are in days but are still small relative to mission times. For specified orbital-launch missions, perigee-propulsion nuclear rocket systems are shown to equal continuous-thrust performance with reactor powers an order of magnitude less than those of continuous-thrust systems. Application and operational aspects of perigee propulsion are discussed. (Author)

PB 162 944 OTS $1.60

Naval Missile Center, Point Mugu, Calif.
CONCEPT FOR SEA LAUNCHING MISSILES AND TRANSPORTING LARGE BOOSTERS USING A TUBE, by N. Kamalian. 15 June 62, 16p. 2 refs. Miscellaneous pub. no. NMC-MP-62-4; NASA N62-13838.

DESCRIPTORS: *Guided missiles, *Launching, *Guided missile launchers, Hydrodynamics, *Underwater ballistics, Boosters, Transportation.

The purpose of this report is to introduce a preliminary concept of a system which will further enhance the feasibility and versatility of the sea-launch concept. The proposed system makes it possible to take almost any missile, regardless of size and type of propellant, and launch it from the sea. The system involves enclosing the missile in a reusable capsule or tube which can then be towed underwater, erected to the vertical, and the missile launched from this tube.

Sanitation and Safety Engineering

WT-560 OTS $2.60

Defense Atomic Support Agency, Albuquerque, N. Mex.
HASTY TYPE AIR RAID SHELTERS, by Albert E. Murdock. Operation Tumbler. Feb 53, declassified 5 Sep 62. 26p.

ORNL-3380 OTS $1.25

Oak Ridge National Lab., Tenn.
EVALUATION OF A REDUCED PRESSURE BACK-FLOW PREVENTER USING ACTIVATION ANALYSIS, by Justus N. Baird, Jr., W. R. Sanford, and G. A. Cristy. Rept. on Contract W7405-eng-26. 1962. 49p. 14 refs.

FOOD, HANDLING, AND PACKAGING EQUIPMENT

Food

PB 162 869 OTS $5.60

American Meat Inst. Foundation, Chicago, Ill.
BEHAVIOR OF WATER PHASES IN FREEZE DRYING, by G. D. Wilson. Rept. no. 9 (Final), 26 Dec 58-19 Mar 61, on Contract DA 19-129-qm-1347. [1961] 51p. 9 refs. File no. A-332.

DESCRIPTORS: Behavior, Water, *Freeze drying, *Beef, *Pork, Muscles, Calorimetry, Dilatometers.

A two-fold approach was adopted to gain some understanding of the behavior of water phases during freeze-drying of beef and pork muscle: (1) a study of the freezing process and (2) a study of the freeze-dried muscle.

PB 162 870 OTS $3.60

Agricultural Research Service, Albany, Calif.
RADIATION PRESERVATION OF POULTRY PRODUCTS, by Hans Lineweaver. Rept. no. 4 (Final), 1 Mar 61-28 Feb 62, on Preservation of Poultry Products. [1962] 38p. 33 refs. File no. S-569.

DESCRIPTORS: *Radiation effects, *Preservation, *Meat, Storage, Taste, Discoloration, Colors.

Irradiation-sterilization of meat and storage at ambient or higher temperatures cause changes in its flavor, texture and color. The published reports on studies of beef and pork show considerable difference of opinion concerning the importance of these changes. This is not surprising since the relative importance of flavor, texture and color in overall quality is debatable, and differences are determined by sensory methods that differ from laboratory to laboratory. Also, the conditions of processing, irradiation, and storage frequently influence these quality factors to different degrees, and comparable conditions were seldom used at different laboratories. (Author)

PB 163 014 OTS $13.00

Booz-Allen and Hamilton, Inc., Chicago, Ill.
PROPOSED MEAT PACKING INDUSTRY PROGRAM FOR COLOMBIA. Rept. to The United States Operations Mission to Colombia. 31 Aug 61, 195p. 16 refs.

DESCRIPTORS: *Meat packing industry, Meat, Cattle, *Colombia, Economics, Costs, *Industrial plants, Labor, Distribution (Economics), Agriculture, *Foreign policy, Commerce.

It is concluded, based on extensive field work and analysis, that a modern meat packing industry is feasible, provided certain requirements are met. It is also concluded that a business venture in this industry offers the prospect of an adequate return on investment, while at the same time making meat and meat products of good quality available to consumers at favorable prices.

PB 163 014-S1 OTS $10.10

Booz-Allen and Hamilton, Inc., Chicago, Ill.
PROPOSED MEAT PACKING INDUSTRY PROGRAM FOR COLOMBIA, APPENDIX. Rept. to The United States Operations Mission to Colombia. Aug 61, 123p. 3 refs.

DESCRIPTORS: *Meat packing industry, Processing, *Colombia, Cattle, Distribution (Economics), Economics, Labor, Agriculture, Meat, *Foreign policy, Commerce.

Contents:
Cattle projections
Plant capacity
Market objectives
Distribution facilities
Facilities investment
Equipment

Pro forma statements
Yields
Sales
Payroll
Raw materials and supplies
Utilities - depreciation
Distribution
Miscellaneous

PB 162 467 OTS $2.60

Continental Can Co., Inc., Chicago, Ill.
RADIATION STERILIZATION OF CANNED FOODS, by J. M. Heinen. Rept. no. 6 (Final), 1 Dec 55-30 June 59. [1959] 21p. 6 refs. File no. S-708; AD-243 361.

DESCRIPTORS: *Food, Containers, Preservation, *Radiation effects, Clostridium botulinum, Spores, Growth, Deterioration, Pork, Processing, Meat, Heating, Gamma rays.

Work was done to determine the effect of meat curing salts and several widely separated irradiation levels on the survival, germination and outgrowth of spores of Clostridium botulinum. Six different formulations of ground ham, corresponding to six different cure compositions were prepared and packed. Radiation levels of 0.465 and 0.93 megarad did not prevent spoilage and the development of toxicity in any formulation. No toxic swells were encountered following irradiation at 2.79 and 3.72 megarad, although two formulations each gave one swelled non-toxic sample at 3.72 megarad. Irradiation at 1.86 megarad resulted in toxic spoilage in one formulation and one sample of non-toxic spoilage in another formulation. Since these results are based on only 10 can lots for each formulation - irradiation variable with a comparatively low challenge dose of spores of Cl, botulinum it might be expected that larger sample lots or a higher level of spore inoculum would result in spoilage of other formulations at the 1.86 megarad radiation dose or even at the 2.79 level. (Author)

PB 162 814 OTS $7.60

Kentucky U., Lexington.
THE EXTENSION OF STORAGE LIFE OF FRESH FRUIT AND VEGETABLES BY IONIZING RADIATION, by Dudley C. Martin. Rept. no. 9 (Final), 27 June 57-26 June 61, [1961] 71p. File no. S-742.

DESCRIPTORS: Storage, *Preservation, *Fruits, *Vegetables, *Radiation effects, Gamma rays, Freezing.

The general objective of these studies was to evaluate products which were prepared as for freezing but were stored at temperatures slightly above freezing. Samples subjected to gamma radiation, generally at levels below 2 megarads, in combination with other treatments, were compared with unirradiated controls and frozen controls over storage periods up to 12 months. (Author)

PB 162 871 OTS $5.60

Quantum, Inc., Wallingford, Conn.
LITERATURE SURVEY OF VIRUSES AND RICKETTSIA IN FOODS, by J. F. McCrea. Rept. no. 4 (Final), 5 June 61-4 June 62, on Contract DA 19-129-qm-1810. [1962] 52p. 114 refs. File no. S-610.

DESCRIPTORS: *Viruses, *Rickettsia, *Food, Milk, Identification, Classification.

This report is the first known comprehensive review of those viruses and rickettsiae which may contaminate food and which may subsequently initiate infection in man. There are 10 viruses and 1 rickettsia which have this this cap ability. Milk is the most frequent vehicle for virus infection in man. The total inactivation dose recommended is $5x10^6$ roentgens for all viruses except infectious hepatitis. For this virus a dose of $2x10^7$ roentgens is recommended. (Author)

PB 162 490 OTS $1.60

Swift and Co., Chicago, Ill.
THE EFFECT OF SUB-STERILIZING DOSES OF CATHODE RAYS AND GAMMA RAYS ON THE KEEPING QUALITIES OF PORK, by F. L. Kauffman. Rept. no. 14 (Final), 6 Dec 54-1 Jan 62. [1962] 17p. File no. S-702.

DESCRIPTORS: *Radiation effects, *Gamma rays, *Preservation, *Pork, Colors, Taste, Odors, Electrons.

Sub-sterilizing doses of both cathode ray irradiation and gamma ray irradiation were believed to be able to prolong the shelf life of commercial cuts of pork and beef. Experiments were designed to compare the effects of cathode ray and gamma ray irradiation on the keeping qualities of beef under conditions usually found in commercial handling. The keeping quality was judged as to color, flavor and odor over an extended period of time.

MACHINERY, FABRICATION, AND ACCESSORY EQUIPMENT

Engines and Propulsion Systems

PB 162 956 OTS $5.60

Air Force Flight Test Center, Edwards AFB, Calif.
A STUDY OF THE PROPELLANT SPECIFIC IMPULSE-DENSITY TRADE-OFFS OF SOLID PROPELLANT ROCKET MOTORS, by E. R. Flemig and J. R. Carnes. July 60, 56p. AFFTC-TN-60-29; AD-241 869.

DESCRIPTORS: *Rocket motors, Solid rocket propellants, Specific impulse, Thrust, Guided missiles.

This report presents the propellant specific impulse-density trade-offs for a series of missiles and for several typical missions. The results are in the form of several graphs from which the engineer can judge the relative performance of most solid propellants with a high degree of accuracy. (Author)

PB 162 937 OTS $10.10

Aviation Gas Turbine Div., Westinghouse Electric Corp. [Lester, Pa.]
AMBIENT TEMPERATURE EFFECTS ON J34-WE-48 TURBOJET ENGINE PERFORMANCE, by W. F. Schmidt and D. W. Stephenson. Rept. on Contract NOas 59-0221i. 29 Apr 60, 121p. Rept. no. A-2681; AD-249 460.

DESCRIPTORS: *Turbojet engines, Temperature, Tests, Specific heat, Reynolds number, Thermodynamics, Combustion, Corrections, Errors, Gas flow, Operation.

A J34-WE-48 engine was tested at various ambient temperatures to check current methods for correcting sea level static test data to standard day conditions. The test results indicate that current correction factors are not satisfactory because of the performance effects caused by variations in specific heats, Reynolds number, gas properties, combustor efficiency, etc with ambient temperature. Improved ambient correction factors which include the above effects are recommended for use in correcting J34-WE-48 production engine test data to standard conditions. These correction factors are presented in this report. (Author)

NASA N63-13899 OTS $4.60

Flight Research Center, National Aeronautics and Space Administration, Edwards, Calif.
FLIGHT TESTS OF A TWIN-DUCT INDUCTION SYSTEM FOR A MACH NUMBER RANGE OF 0.78 TO 2.07, by Jack Nugent and Bruce G. Powers. Sep 60, declassified, 44p. 9 refs. Technical memo. X-281.

NASA N63-13896 OTS $6.60

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
TRANSONIC OFF-DESIGN PERFORMANCE OF A FIXED DIVERGENT EJECTOR DESIGNED FOR A MACH NUMBER OF 2.0, by Harry T. Norton, Jr. Marlow D. Cassetti, and Charles E. Mercer. 63p. 8 rers. Technical memo. X-165, Dec 59, declassified 1 Apr 63.

NASA N63-12530 OTS $0.75

Lewis [Research Center, National Aeronautics and Space Administration] Cleveland, Ohio.
ALTITUDE INVESTIGATION OF CAN-TYPE FLAME HOLDER IN 20-INCH-DIAMETER RAM-JET COMBUSTOR, by George R. Smolak and Carl B. Wentworth. 3 June 54, declassified 27 Sep 62. 28p. 5 refs. Research memo. RM E54D08.

NASA N63-12524 OTS $2.25

Lewis [Research Center, National Aeronautics and Space Administration] Cleveland, Ohio.
AN ANALYSIS OF AIR-TURBOROCKET ENGINE PERFORMANCE INCLUDING EFFECTS OF COMPONENT CHANGES, by Roger W. Luidens and Richard J. Weber. 6 Apr 56, declassified 22 Aug 62. 98p. 13 refs. Research memo. RM E55H04a.

NASA N63-13905 OTS $4.60

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
A COLD-FLOW INVESTIGATION OF JET-INDUCED THRUST-VECTOR CONTROL, by John E. McAulay and Albert J. Pavli. Dec 60, declassified 1 Apr 63. 45p. 1 ref. Technical memo. X-416.

NASA N63-12531 OTS $1.00

Lewis [Research Center, National Aeronautics and Space Administration] Cleveland, Ohio.
COMBINED COMPRESSOR COOLANT INJECTION AND AFTER-BURNING FOR TURBOJET THRUST AUGMENTATION, by James W. Useller, S. C. Huntley, and David B. Fenn. 16 Sep 54, declassified 27 Sep 62. 35p. 21 refs. Research memo. E54G08.

NASA N63-12516 OTS $0.75

Lewis [Research Center, National Aeronautics and Space Administration] Cleveland, Ohio.
COMPARISON OF CALCULATED AND EXPERIMENTAL TEMPERATURES AND COOLANT PRESSURE LOSSES FOR A CASCADE OF SMALL AIR-COOLED TURBINE ROTOR BLADES, by Francis S. Stepka. 4 Sep 58, declassified 17 July 62. 26p. 13 refs. Research memo. RM E58E20.

NASA N63-12544 OTS $0.50

Lewis [Research Center, National Aeronautics and Space Administration] Cleveland, Ohio.
COMPARISON OF INJECTORS WITH A 200-POUND-THRUST AMMONIA-OXYGEN ENGINE, by Richard J. Priem and Bruce J. Clark. 4 Sep 58, declassified 22 Aug 62. 10p. 4 refs. Research memo. RM E57H01.

NASA N63-12515 OTS $0.75

Lewis [Research Center, National Aeronautics and Space Administration] Cleveland, Ohio.
EFFECT OF PRESSURE LEVEL ON AFTERBURNER-WALL TEMPERATURES, by Thomas B. Shillito and George R. Smolak. 11 June 58, declassified 17 July 62. 25p. 5 refs. Research memo. RM E58D01.

NASA N63-13987 OTS $2.60

Lewis [Research Center, National Aeronautics and Space Administration] Cleveland, Ohio.
INVESTIGATION OF ADJUSTABLE SUPERSONIC INLET IN COMBINATION WITH J34 ENGINE UP TO MACH 2.0, by J. C. Nettles and L. A. Leissler, 15 Oct 54, declassified 16 Oct 61. 29p. 6 refs. Research memo. RM E54H11.

NASA N63-12514 OTS $0.75

Lewis [Research Center, National Aeronautics and Space Administration] Cleveland, Ohio.
INVESTIGATION OF ROTATING-STALL LIMITS IN A SUPERSONIC TURBOFAN ENGINE, by James F. Dugan, Jr. 3 Oct 57, declassified 17 July 62. 27p. 13 refs. Research memo RM E57G26a.

NASA N63-12540 OTS $0.75

Lewis [Research Center, National Aeronautics and Space Administration] Cleveland, Ohio.
LOW-TEMPERATURE CHEMICAL STARTING OF A 200-POUND-THRUST JP-4 – NITRIC ACID ROCKET ENGINE USING A THREE-FLUID PROPELLANT VALVE, by Glen Hennings and Gerald Morrell. 30 June 55, declassified 17 July 62. 25p. 16 refs. Research memo. RM E55E04.

NASA N63-12517 OTS $1.50

Lewis [Research Center, National Aeronautics and Space Administration] Cleveland, Ohio.
OFF-DESIGN PERFORMANCE OF DIVERGENT EJECTORS, by Milton A. Beheim. 30 Sep 58, declassified 17 July 62. 62p. 4 refs. Research memo. RM E58G10a.

NASA N63-12522 OTS $0.75

Lewis [Research Center, National Aeronautics and Space Administration] Cleveland, Ohio.
PERFORMANCE OF A SUPERSONIC RAMP-TYPE SIDE INLET WITH RAM-SCOOP THROAT BLEED AND VARYING FUSELAGE BOUNDARY-LAYER REMOVAL MACH NUMBER RANGE 1.5 TO 2.0, by Glenn A. Mitchell and Robert C. Campbell. 17 Jan 57, declassified 17 July 62, 30p. 5 refs. Research memo. RM E56I26.

NASA N63-12191 OTS $0.75

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
PERFORMANCE OF A TURBOJET ENGINE IN COMBINATION WITH AN EXTERNAL-INTERNAL-COMPRESSION INLET TO MACH 2.88, by David N. Bowditch, Bernhard H. Anderson, and William K. Tabata. July 60, declassified 17 July 62. 30p. 16 refs. Technical memo. X-254.

NASA N63-12523 OTS $1.00

Lewis [Research Center, National Aeronautics and Space Administration] Cleveland, Ohio.
PERFORMANCE OF VARIABLE TWO-DIMENSIONAL INLET DESIGNED FOR ENGINE-INLET MATCHING. I. PERFORMANCE AT DESIGN MACH NUMBER OF 3.07, by M. A. Beheim and L. W. Gertsma. 20 Nov 56, declassified 22 Aug 62. 32p. 3 refs. Research memo. RM E56H23.

NASA N63-12545 OTS $0.75

Lewis [Research Center, National Aeronautics and Space Administration] Cleveland, Ohio.
PRELIMINARY ANALYSIS OF THREE CYCLES FOR NUCLEAR PROPULSION OF AIRCRAFT, by L. V. Humble, W. W. Wachtl, and R. B. Doyle. 13 Oct 50, declassified 22 Aug 62. 25p. 4 refs. Research memo. RM E50H24.

NASA N63-12511 OTS $0.75

Lewis [Research Center, National Aeronautics and Space Administration] Cleveland, Ohio.
A STUDY OF INJECTION PROCESSES FOR 15-PERCENT FLUORINE - 85-PERCENT OXYGEN AND HEPTANE IN A 200-POUND-THRUST ROCKET ENGINE, by M. F. Heidmann. 15 Jan 57, declassified 22 Aug 62. 25p. 4 refs. Research memo. RM E56J11.

Manufacturing Equipment and Processes

OTS SB-513 $0.10

Office of Technical Services, Dept. of Commerce, Washington, D. C.
CONTINUOUS CASTING - FOREIGN LITERATURE. Feb 63, 7p. 63 refs. OTS Selective Bibliography SB-513.

DESCRIPTORS: *Bibliography, *Casting.

Lists 63 references to translations on continuous castings. Covers automatic casting, flow patterns, effects of cooling, shrinkage phenomenon, investigation by radioisotopes, casting of tubes, casting of aluminum wire and a world list of installations among other subjects. (Author)

OTS SB-402, Revised $0.10

Office of Technical Services, Dept. of Commerce, Washington, D. C.
WELDING (SUPPLEMENT TO CTR'S 324-331). Jan 63, 35p. 783 refs. OTS Selective Bibliography SB-402, rev.

DESCRIPTORS: *Bibliography, *Welding, Electron beams, Ultrasonic radiation, Spot welding, Arc welding, Electric welding.

Lists 783 references to WELDING added to the OTS collection during the period 1957 to January 1963. Covers new developments in welding such as plasma, electron beam, ultrasonic, fusion, resistance, spot, arc, friction and cold welding among other subjects. (Author)

MATERIALS

AD-280 642 OTS $2.60

Armour Research Foundation, Chicago, Ill.
DEVELOPMENT OF BONDING METHODS AND MATERIALS FOR RESISTANCE STRAIN GAGES, by H. L. Rechter. Rept. on Development of High Temperature Strain Gages, Contract N156S-32317. Nov 58, 22p. Rept. no. NAVAIRMATCEN-ASL-1050, Part III.

DESCRIPTORS: *Strain gages, *Bonding, *Heat resistant materials, *Adhesives, Silicon compounds, Oxides, Aluminum compounds, Phosphates, Potassium compounds, Silicates, Electrical properties, Moistureproofing, Heat treatment, Aging.

As a phase in the program of development of high temperature strain gages, the work performed in formulating cements is reported. The major effort of this project has been to develop a cement useful to temperatures of 1600°F and higher, having adequate electrical and load-bearing properties.

PB 162 876 OTS $5.60

Cryogenic Lab., Ohio State U. Research Foundation, Columbus.
THERMAL CONDUCTIVITY OF HEAT INSULATING MATERIALS, by R. W. Powers, H. L. Johnston and others. Technical rept. no. 16 on Contract W33-038-ac-14794 (16243). 1 May 53, declassified 19 Apr 54, 59p. Rept. no. TR-264-16; AD-27 569.

DESCRIPTORS: *Cryogenics, *Fuels, *Liquefied gases, Air, Nitrogen, Hydrogen, Storage, *Thermal insulation, Cotton, Glass textiles, Gels, Silicon compounds, Dioxides, Foams, Styrene plastics, *Thermal conductivity.

The thermal conductivities of various insulators were studied for subsequent correlation of data with physical structure and external-factor influences. Thermal conductivities at liquid-air. -N. and -H temperatures were measured in vacuo and in the presence of gaseous H and N at various pressures. Evaluations of medical cotton, Fiberglas, Santocel, silica, Pliofoam, Styrofoam, polystyrene colloidal aggregate, and Polyfiber indicated that the thermal conductivities of the insulators could be divided into 3 classes of physical structures: granular, fibrous, and cellular. Under high vacuum, heat transfer through granular insulators depended upon only the difference in the fourth power of the temperatures of the ball and sphere. Granular insulators apparently functioned as radiation shields. The fibrous insulators conducting heat along the length of the fibers reduced insulating efficiency at low temperatures, but served to some degree as a radiation shield. Heat transfer through cellular insulators was slightly greater than through a vacuum, and the transfer was approximately a linear function of the fifth-power difference between ball and sphere temperatures. Experimental data are tabulated.

PB 162 864 OTS $1.60

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
DURABILITY OF RUBBER-MODIFIED POLYSTYRENES, by Cecilia U. McNally. Oct 58, 13p. 3 refs, Technical rept. 2413, Addendum 1; AD-202 005.

DESCRIPTORS: *Elastomers, *Styrene plastics, *Rubber, Mixtures, Mechanical properites, Storage, Aging (Materials), Polymers.

A rubber-modified polystrene (Material F) was stored for three years at 160°F. Flexural strength, flexural deflection, flexural modulus, and Izod impact strength were determined at frequent intervals over this period. While the flexural strength and modulus increased and the Izod strength decreased, this material was very much superior in the retention of its original properties to the material originally submitted by this manufacturer. (Author) (See also PB 129 505)

TID-17382 OTS $4.60

General Electric Co., Cincinnati, Ohio.
RADIATION DAMAGE TO NON-METALLIC MATERIALS, by V. P. Calkins. [Rept. on Contract AT(11-1)171]. 30 Mar 54, 42p. 18 refs.

NASA N62-17056 available on loan from OTS

Michigan U., Ann Arbor.
DESTRUCTION OF MATERIAL THROUGH CAVITATION INVESTIGATION WITH AN OSCILLATOR, by Hans Nowotny. Internal rept. no. 15 on Grant NsG-39-60. 1942, trans. June 62. 100p, 70 refs. ORA Proj. 03424.

OTS SB-512 $0.10

Office of Technical Services, Dept. of Commerce, Washington, D. C.
INDUSTRIAL DIAMONDS. Jan 63, 7p. 120 refs. OTS Selective Bibliography SB-512.

DESCRIPTORS: *Industrial diamonds, *Diamonds, *Abrasives, *Semiconductors, *Bibliography.

Lists 120 references on this subject added to the OTS collection during the period 1943 to January 1963. Covers foreign and domestic research on diamond dust; use as abrasive in grinding and polishing; diamond dies; reclamation of diamond waste; hardness tests; colored diamonds; synthetic diamonds; radiation damage; semiconductor properties and optical properties among other subjects. (Author)

Ceramics and Refractories

PB 162 987 OTS $2.60

Army [Missile Command] Redstone Arsenal, Huntsville, Ala.
FLAME SPRAYED CERAMIC COATINGS, by V. F. Seitzinger and E. F. Sharpe. 13 June 60, 26p. 10 refs. Rept. no. DSN-TN-14-60.

DESCRIPTORS: *Ceramic coatings, Physical properties, *Flame spraying, *Plasma jets, Satellites (Artificial), Rocket motor nozzles, Coatings.

This report provides a briefing to designers and users of materials for missile applications on the nature, properties, and general characteristics of flame sprayed ceramic coatings. After a discussion of general principles of the method, various techniques are described. This is followed by examples of application within the agency. (Author)

PB 162 923 OTS $4.60

Bjorksten Research Labs., Inc., Madison, Wis.
HIGH VISCOSITY REFRACTORY FIBERS, by Stanley A Dunn and William P. Roth. Quarterly rept. no. 2, 20 Jan-20 Apr 60, on Contract NOrd-19100. [1960] 41p. 2 refs. AD-239 643.

DESCRIPTORS: *Refractory materials, Ceramic materials, *Glass, *Ceramic fibers, Viscosity, Additives, Air, Heat transfer, Test methods, Bonding, *Glass textiles.

Penetrometer viscosity tests were run on 28 glass mixtures. One series of tests revealed effects on viscosity exerted by the particle size of the additive and by the presence of air occluded in the melt. The alpha-rod test equipment was completed and tested out to determine the torch heat flux under various conditions of torch tip distance from sample, oxygen and acetylene flow rates, and nitrogen flow rate. Further tests were carried out to determine the important factors which must be controlled in order to obtain reproducible thermocouple readings from the rear surface of the alpha-rod. Equipment was assembled and preliminary experiments were run to determine, by observation of contact angles, the wettability of the binding material by various molten glass mixtures. (Author)

PB 162 925 OTS $2.60

Electro-Thermal Industries, Inc., Pearl River, N.Y.
INVESTIGATION OF TITANIUM BORONITRIDE AND TANTALUM BOROCARBIDE MATERIALS SYSTEMS, by Gerard J. Forney and J. J. Marshall. Quarterly rept. no. 2 on Contract DA 30-069-ORD-3126. Jan 61, 29p. Technical rept. no. WAL 371.9/2; AD-253 669.

DESCRIPTORS: *Refractory materials, *Borides, *Tantalum compounds, *Titanium compounds, *Carbides, *Nitrides, Boron compounds, Ceramic materials, Processing, Density, Thermoelectricity, Rocket motor nozzles, Electrical properties, Physical properties, Mechanical properties

Continuing the investigation of the titanium boronitride system, efforts were directed in major part to Phase 2, effect of composition on properties. Compositions containing 0, 1/2, 1 1/2, 2, 3, 4 and 6 moles excess boron nitride were selected for study. It was evident that blends containing 3 or more moles excess had insufficient cohesiveness to be of any practical value. Consequently, the balance of the investigation upon compositions was devoted to the 1/2, 1, 1 1/2 and 2 mole blends. The investigation was conducted at reactor pressures of 20,000 and 30,000 psi. It was concluded that: (1) Density decreases with increasing excess boron nitride in the blend; (2) Density increases as the reactor pressure increases for each composition; (3) Electrical resistivity increases with decreased specimen density for each composition; and (4) Preheat energy requirements are not directly proportional to increased mass, due to heat losses at a greater rate from small charges.

PB 162 914 OTS $1.60

Forest Products Lab., Madison, Wis.
TEMPERATURE OF THE FOREST SERVICE GRAPHITE PLATE SOURCE OF THERMAL RADIATION, by H. D. Bruce and L. E. Downs. 22 Jan 58, 16p. 10 refs. Technical rept. AFSWP-793; AD-153 165.

DESCRIPTORS: *Heat production, *Thermal radiation, *Blackbody radiation, *Graphite, Filters (Electromagnetic wave).

A study was made to determine (1) the rate of cooling, (2) the average plate temperature, and (3) the nature of the spectrum of the radiation of a 3/8-in.-thick graphite plate with a 12- x 12-in. effective area during the first few seconds of exposure in air when withdrawn from an electrically heated muffle furnace at an initial temperature of 4200°F. The color temperature of the plate was obtained roughly by means of 4 Corning filters. The transmission of the radiation from the white-hot graphite plate by each filter was measured over a period of several seconds and transmission ratios were obtained for each filter. These ratios were compared with the calculated transmission ratios of the filters for black body radiation from 3800° to 4500°F to obtain the color temperature of the graphite plate. A series of 10 measurements was made with a NRDL Mk 6-F radiometer to determine how far the plate temperature was likely to vary from 4200°F in consecutive trials, and how rapidly the temperature would fall during the initial exposure. The average initial temperatures, as determined by the filters, was 4130°F, and a loss of about 1000° in the first 7 seconds of cooling was indicated. (ASTIA abstract)

PB 162 908 OTS $2.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
THE THERMAL EXPANSION OF SYNTHETIC GRAPHITES AT TEMPERATURE INTERVALS BETWEEN 80 AND 2000°F, by Robert D. Allen. Rept. on Contract NASw-6. 30 Nov 59, 22p. 30 refs. Progress rept. no. 30-20; AD-235 454.

DESCRIPTORS: *Graphite, *Thermal expansion, Temperature, Determination, Dilatometers

The mean linear and cubical coefficients of thermal expansion of eight commercial lots of graphite were determined for temperature intervals between 80 and 2000°F. The linear thermal expansion was measured with an automatic recording dilatometer using a rod-shaped specimen 2 in. long and 1/4 in. across. The specimen was heated in an atmosphere of helium. The results are in good agreement with those of Currie, Hamister, and MacPherson. The mean linear coefficient was found to increase with temperature. For the lots studied, the mean linear coefficients from 80 to 2000°F were 1.50 to 2.34 X 10^{-6}/°F parallel and 2.26 to 3.45 X 10^{-6}/°F perpendicular to the grain and were found to vary linearly with the electrical resistivity measured at 32°F. (Author)

PB 162 886 OTS $1.60

Materials Research Lab., U. of California, Berkeley.
INVESTIGATION OF FEASIBILITY OF FABRICATING DUCTILE CERAMICS, by T. H. Hazlett. Annual rept. no. 1 on Contract NOas 59-6056-c. May 60, 18p. IER series no. 157, issue no. 1; AD-239 848.

DESCRIPTORS: *Ceramic materials, *Crystals, Plasticity, Plastic flow, Extrusion, Processing, Sodium compounds, Lithium compounds, Chlorides, Fluorides, Hydraulic presses, Microstructure, Impurities.

An investigation was initiated to determine the feasibility of using procedures similar to those for metal forming, such as extrusion, rolling, and rolling and forging, for the shaping of polycrystalline aggregates of cubic ionic solids. Work was begun on CP grade LiF powder compacts sintered in an extrusion die of hot working die steel at 500°C and extruded with an initial ram pressure of 120,000 psi. The die geometry provided a 64:1 reduction. Microstructures of extruded rods were studied. No satisfactory explanation has been found for the observed relationship between grain size and ductibility, but the degree of purity is very important. (Author)

PB 162 927 OTS $7.60

New Jersey Ceramic Research Station, Rutgers U., New Brunswick.
IMPROVED CERAMICS. Progress rept. no. 1, 1 Dec 54-1 Mar 55, on Contract DA 36-039-sc-64566. [1955] 71p. AD-74 091.

DESCRIPTORS: *Ceramic materials, *Aluminum compounds, Titanates, Oxides, Lithium compounds, *Silicon compounds, *Lead compounds, Silicates, *Wollastonite, *Mullite, *Talc, Electrical properties, Thermal stresses, Impact shock, Shock resistance, Molding materials, Machining, *Electronic equipment, *Petrology, Thermal conductivity.

Preliminary efforts were undertaken on a program to evaluate new industrial bodies with high thermal conductivity. The frit type lithium aluminosilicate bodies which show the most promise as high frequency insulation exhibit appreciable variability as to maturity and electrical properties. The effect of soda and iron oxide was studied systematically as a method of controlling this variable. The effect of varying the wollastonite content of body E-16-S while retaining the ratio of its fluxing ingredients was studied. Petrographic analysis of the wollastonite-clay series is presented. In it is described the orientation of the wollastonite needles and their probable effect on impact strength. A study was made on a portion of the spodumene-lead bisilicate-clay triaxial in an attempt to control the very low firing shrinkage or expansion of the spodumene type bodies.

PB 162 929 OTS $8.60

New Jersey Ceramic Research Station, Rutgers U., New Brunswick.
IMPROVED CERAMICS. Progress rept. no. 2, 1 Mar-1 June 55, on Contract DA 36-039-sc-64566. [1955] 96p. 6 refs. AD-74 092.

DESCRIPTORS: *Ceramic materials, *Aluminum compounds, Titanates, *Lithium compounds, Silicates, *Clay, *Talc, *Wollastonite, *Barium compounds, *Magnesium compounds, *Silicon compounds, Oxides, *Lead compounds, Thermal conductivity, Thermal stresses, Impact shock, Shock resistance, Molding materials, Machining, *Petrology, *Electronic equipment.

Bodies containing both negative thermal expanding crystalline phases, aluminum titanate and beta-spodumene (resulting from petalite) show a great deal of promise. In an attempt to improve the thermal shock properties of an existing dielectric body by lowering its thermal expansion, wollastonite was substituted for talc in a typical steatite body. Body E-16-S (60% wollastonite, 20% clay, 10% barium carbonate and 10% lead bisilicate) was used as the base composition in which to systematically substitute an ultra fine talc for wollastonite in an attempt to improve further the electrical properties. Six ternary compounds have been reported in the high lead portion of the lead oxide-alumina-silica system under equilibrium conditions. The best forsterite body reported has slightly poorer properties as compared to the wollastonite body at 1 megacycle but slightly better properties at ultra high frequencies. An attempt was made to determine the presence of any ternary compounds in the BaO-MgO-SiO_2 system. The petrographic analyses of the wollastonite-talc-mullite bodies are presented for the purpose of correlating texture and impact strength. The procedure for thermal conditioning steatite, mullite, wollastonite and alumina bodies is presented. A systematic study of a portion of the spodumene-clay-lead bisilicate system has been made. (See also PB 162 927)

PB 162 928 OTS $7.60

New Jersey Ceramic Research Station, Rutgers U., New Brunswick.
IMPROVED CERAMICS. Progress rept. no. 3, 1 July-1 Sep 55, on Contract DA 36-039-sc-64566. [1955] 73p. 5 refs. AD-74 093.

DESCRIPTORS: *Ceramic materials, *Aluminum compounds, Titanates, *Calcium compounds, *Barium compounds, *Magnesium compounds, *Clay, *Lithium compounds, Oxides, Silicates, *Wollastonite, *Lead compounds, *Talc, *Mullite, Thermal conductivity, Thermocouples, Thermal stresses, Impact shock, Shock resistance, Extrusion, Molding materials, Machining, *Electronic equipment.

A new method of attaching thermocouple wires is described. A study of the effect of compounds of calcium, barium and magnesium as minor additions to the lithium aluminosilicate type body indicated that the oxides of these alkaline earths should be advantageous. A series of wollastonite bodies have been studied with respect to particle size, method of fabrication and composition. Two spodumene type bodies have been evaluated as zero firing shrinkage bodies by varying the forming pressure and firing temperature in the maturing range. The firing shrinkages of two lead aluminosilicate type bodies were investigated when formed in the pressure range of 10 to 30 tons. (See also PB 162 929)

PB 162 934 OTS $6.60

New Jersey Ceramic Research Station, Rutgers U., New Brunswick.
IMPROVED CERAMICS. Progress rept. no. 4, 1 Sep-1 Dec 55, on Contract DA 36-039-sc-64566. [1955] 66p. 1 ref.

DESCRIPTORS: *Ceramic materials, *Alkali metal compounds, *Lead compounds, Oxides, *Aluminum compounds, Silicates, *Quartz, *Talc, *Wollastonite, *Mica, Thermal conductivity, Thermal stresses, Impact shock, Shock resistance, Molding materials, Machining, Electronic equipment

An industrially prepared frit, of the QC6F type used as a body ingredient in the vitrified, negative thermal expanding lithium aluminosilicate body possessing high thermal shock resistance, was evaluated and compared to the same body made with laboratory prepared frit. In an attempt to improve the electrical properties of the lithium aluminosilicate type body, a study of the effect of the additions of individual and mixed alkalies was made. An attempt has been made to lower the loss factor of the best wollastonite body (E-16-S) by introducing small percentages of lead oxide into this body. Procelain type bodies, having loss factors in the grade L-3 category, are the only bodies containing quartz in an appreciable quantity, which are used for dielectric insulation. Thermal conditioning steatite tubes increases the power factor of this type body, whereas slow cooling decreases its power factor. In an attempt to lower the fabricating pressure of spodumene type bodies, the composition of Sp-1 (60% spodumene, 40% Alsilox) was taken as a base composition to which clay was added at 3% increments. (See also PB 162 928)

PB 162 930 OTS $7.60

New Jersey Ceramic Research Station, Rutgers U., New Brunswick.
IMPROVED CERAMICS. Progress rept. no. 5, 1 Dec 55-1 Mar 56, on Contract DA 36-039-sc-64566. [1956] 74p. AD-104 826.

DESCRIPTORS: *Ceramic materials, *Cryolite, *Aluminum compounds, *Lithium compounds, Silicates, *Lead compounds, *Quartz, *Wollastonite, Thermal conductivity, Thermal stresses, Impact shock, Shock resistance, Molding materials, Machining, *Electronic equipment

The thermal conductivity data of four industrial bodies whose alumina content are 98, 95, 89 and 85% respectively, are presented along with that of a titania body. The QC6 frit, which when added in a body results in the best high thermal shock resistant body, has a high fritting temperature and is very viscous. The mineral cryolite was added to the base frit at 0.0, 1.5, 3.0 and 4.5% increments with the object of lowering melting temperature and viscosity. Quartz type bodies in the triaxial quartz-boron phosphate-clay (E. P. K.) were investigated for fabricating and dielectric properties. In an attempt to further improve the electrical properties of body E-16-S, the principal crystalline phase, namely wollastonite, was replaced by pseudo-wollastonite, the high temperature form of calcium silicate. Bodies of the ternary compositional diagram wollastonite-clay-flux have been evaluated for modulus of rupture, modulus of elasticity and impact strength. Bodies have been developed, in the lead oxide-alumina-silica system, which have 0.0% firing shrinkage. (See also PB 162 934)

PB 162 935 OTS $7.60

New Jersey Ceramic Research Station, Rutgers U., New Brunswick.
IMPROVED CERAMICS. Progress rept. no. 6, 1 Mar-1 June 56, on Contract DA 36-039-sc-64566. [1956] 80p. 4 refs. AD-204 659.

DESCRIPTORS: *Ceramic materials, *Aluminum compounds, *Lithium compounds, Silicates, *Wollastonite, *Clay, Thermal conductivity, Thermal stresses, Impact shock, Shock resistance, Molding materials, Machining, *Electronic equipment

Two types of commercially prepared silicon carbide bodies were evaluated. A direct substitution of wollastonite for talc in typical steatite bodies has resulted in the development of diopside ($CaMgSiO_4$) as the principal crystalline phase. An attempt is being made to incorporate the findings with the frit-clay type lithium aluminosilicate body into the development of a petalite type lithium aluminosilicate body, the object being to incorporate the desirable properties of both type bodies into one. Several quartz type bodies in the triaxial quartz-boron phosphate-clay (E. P. K.) were found to have ultra low loss dielectric properties. In an attempt to explain the high impact strength of wollastonite bodies a study of particle size and orientation with respect to the longitudinal axis of the rods was made. The results obtained in impact testing ceramics by the standard A. S. T. M. method (D256-54T) include the energy required to toss the broken ends (toss factor). A study was made to determine the order of magnitude of the toss factor and ascertain if a test method could be evolved using the basic equipment of the standard A. S. T. M. method. All efforts in development of zero firing shrinkage bodies have been directed toward the pressing process. (See also PB 162 930)

PB 162 936 OTS $7.60

New Jersey Ceramic Research Station, Rutgers, U., New Brunswick.
IMPROVED CERAMICS. Progress rept. no. 9, 1 Dec 56- 1 Mar 57, on Contract DA 36-039-sc-64566. [1957] 80p. 158 refs. AD-146 675.

DESCRIPTORS: *Ceramic materials, *Clay, *Zirconium compounds, Silicates, *Aluminum compounds, Lithium compounds, *Wollastonite, Thermal stresses, Impact shock, Shock resistance, Molding materials, Machining, *Electronic equipment, *Electric insulation.

The value of using single crystal electrical properties as a determinant in directing a program of research on new ultra low loss ceramics is outlined. An attempt was made to attain higher specific gravity in the promising wollastonite bodies, the object being that increased impact resistance would be realized. In an attempt to learn the mechanisms by which zero firing shrinkage can be attained, additions of clay, zircon, petalite and wollastonite respectively were made at 5% increments up to 30% to the most promising body developed to date, namely the lead aluminosilicate P2. A study of the effect of glass as an additive to alumina bodies was initiated. (Author) See also PB 162 935

PB 162 933 OTS $7.60

New Jersey Ceramic Research Station, Rutgers U., New Brunswick.
IMPROVED CERAMICS. Progress rept. no. 12, 1 Sep- 1 Dec 57, on Contract DA 36-039-sc-64566. [1957] 76p. 14 refs. AD-154 929.

DESCRIPTORS: *Ceramic materials, *Glass, *Wollastonite, *Aluminum compounds, Oxides, Thermal stresses, Impact shock, Shock resistance, Molding materials, Machining, *Electronic equipment, *Electric insulation, Seals (Stoppers).

High thermal shock ceramics: A further study of the effect of temperature on the devitrification of the QC6 frit was made. The frit was incorporated with clay to form the QC6F1 body. Devitrification was observed in the samples withdrawn at 1500°F and higher. X-ray analyses revealed the presence of lithium silicate and Al_2SiO_5 phases. Ultra low loss ceramics: Three series of ceramic bodies composed of a quartz crystalline phase plus a fluxing phase selected from the B phosphate-BaF_2-talc triaxial were compounded for dielectric evaluation at 8.6 kmc, 24° to 26°C. One series, 60% quartz-40% flux, was tested dry. High impact resistant ceramics: A review was made of the literature. Those results reported agreed well with experimental values for the modulus of elasticity and rupture, and impact strength. Precision molded and machined radio ceramics: The wollastonite-Pb aluminosilicate body, EP2-10, was evaluated by the dry pressing technique at zero moisture content. Zero firing shrinkage was produced when this body was fired to 1770°F over a portion of the forming range evaluated. When fired to 1690° and 1720°F, zero mositure absorption was realized with shrinkages in the range of 0.002 to 0.003 inches. The GP2-6 composition was also evaluated by the same technique. The body showed considerable promise when fired to 1900°F. Physical structure of ceramic insulation: Four analytical approaches to attaining particle packing of maximum density were examined. See also PB 138 939

PB 162 945 OTS $8.10

New Jersey Ceramic Research Station, Rutgers U., New Brunswick.
[LOW LOSS CERAMICS] by N. H. Snyder, E. J. Smoke and others. Progress rept. no. 3, 1 Sep-1 Dec 49, on Contract W 36-039-sc-38188. [1949] 89p. 3 refs. AD-89 089.

DESCRIPTORS: *Ceramic materials, *Dielectrics, Beryllium compounds, *Aluminum compounds, Titanium compounds, *Lithium compounds, *Silicon compounds, Oxides, Zirconium compounds, Silicates, Spinel, Mullite, *Cordierite, Talc, Mica, Thermal conductivity, Thermal shock, Shock resistance, Electrolytes.

An investigation has been conducted regarding the thermal conductivity of various ceramic dielectrics that are commercially available. Bodies listed in order of decreasing conductivity which have been tested include commercial BeO, high alumina, zircon, spinel, medium high alumina, titania, mullite, cordierite, steatite, glass bonded mica and wet process porcelain. An area of negative thermal expansion has been discovered in the lithia, alumina, silica system. The results of the investigation of ceramic materials free of electrolytes for this period indicate that a longer grinding time for compounding the coatings has no noticeable effect on the end results. Experiments are reported using hydrolized tetraethyl orthosilicate as a source for SiO_2 deposition for glazing cordierite. (See also PB 113 566)

PB 162 947 OTS $8.10

New Jersey Ceramic Research Station, Rutgers U., New Brunswick.
[LOW LOSS CERAMICS] by N. H. Snyder, E. J. Smoke and others. Progress rept. no. 6, 1 June-1 Sep 50, on Contract W 36-039-sc-38188. [1950] 90p. ATI-86 345.

DESCRIPTORS: *Ceramic materials, *Dielectrics, *Titanates, *Barium compounds, Titanium compounds, Calcium compounds, Zirconates, *Lithium compounds, *Aluminum compounds, *Silicon compounds, Oxides, Magnesium compounds, *Cordierite, Thermal conductivity, Thermal stresses, Shock resistance, Electrolytes

The thermal conductivity of a body belonging to the system $Li_2O \cdot Al_2O_3 \cdot SiO_2$ and having a negative coefficient of thermal expansion has been evaluated. In the lithia-alumina-silica system there exists an area of negative thermal expansion. In this report the area is systematically evaluated to better establish the boundaries and to determine the overall thermal expansion properties of this area which is of prime importance to thermal endurance. The survey of a portion of the quaternary system $MgO-BaO-Al_2O_3-SiO_2$ revealed the existence of a crystal phase for which the molecular composition $2MgO \cdot BaO \cdot 3Al_2O_3 \cdot 9SiO_2$ is proposed. (See also PB 113 568)

PB 162 946 OTS $8.10

New Jersey Ceramic Research Station, Rutgers U., New Brunswick.
[LOW LOSS CERAMICS] by N. H. Snyder, E. J. Smoke and others. Progress rept. no. 7, 1 Sep-1 Dec 50, on Contract W 36-039-sc-38188. [1950] 84p. ATI-95 249.

DESCRIPTORS: *Ceramic materials, *Dielectrics, *Tin compounds, *Thorium compounds, Lithium compounds, Aluminum compounds, Silicon compounds, Magnesium compounds, Barium compounds, Oxides, *Quartz, *Clay, *Lead compounds, Sulfates, Chromium, *Cordierite, Thermal conductivity, Vacuum apparatus, Thermal expansion, Thermal stresses, Shock resistance, Coatings, Electrolytes

Work was divided into three parts: (1) evaluation of the thermal conductivity of bodies containing high tin oxide, (2) evaluation of a commercial thoria body in an effort to determine whether further work is warranted along this line, and (3) standardization of the high vacuum thermal conductivity apparatus using vitreous silica standard. The sudden expansion of quartz at 573°C and that of cristobalite at approximately 240°C, both of which are due to crystal inversions, are the cause of many thermal shock failures. Methods have been found to eliminate these sudden expansions. Work was done on de-alkalization coatings for improving the surface of the better coatings. Kaolin and lead sulphate show no harmful effects while kaolin and chromium coatings indicate harmful results. Further investigation of compositions in the $MgO-BaO-Al_2O_3-SiO_2$ system is reported. (See also PB 162 947)

Procedures are described for the chemical analysis of (a) mixed acid; (b) white fuming nitric acid; (c) red fuming nitric acid. Criteria of accuracy and precision to be attained in the analysis of acids used in propellant combinations are established. The analytical methods described herein are capable of producing results accurate to within 0.1 ± 0.05 percent, and precise to within 0.03 to 0.07 percent. (Author)

PB 162 941 OTS $3.60

Naval Air Rocket Test Station, Lake Denmark, Dover, N. J.
ANALYTICAL PROCEDURES FOR ROCKET PROPELLANTS. VIII. METALLIC CONTAMINANTS IN NITRIC ACID OXIDIZERS, by John D. Clark, Michael E. Walsh, and Howard G. Streim. July 53, 35p. 13 refs. Rept. no. 34; AD-32 168.

DESCRIPTORS: Rocket propellants, *Liquid rocket propellants, Colorimetric analysis, Nitric acid, *Rocket oxidizers, *Contamination, Metals

Colorimetric methods of analyses were developed for determining the nature and magnitude of contamination of HNO_3 oxidizers by metallic ions from Al or stainless steel containers. An ion or complex species was chosen for each metal contaminant Fe, Ni, Cr, and Mn from steel containers; absorbance of the species was a measure of the concentration of that metal. A wave length was determined at which the absorbance should be measured. Alternate methods were determined for Fe, Ni, and Cr. Two supplementary methods were developed for measuring different concentration ranges of Al in acid. One method was photometric; the 8-hydroxyquinone complex of Al was read at 386 mμ. The other, more sensitive method, measured Al concentration by the red fluorescence of a Pontachrome Blue-Black R-Al lake under UV illumination. A table is presented of the maximum concentration of contaminants which can be ignored in the calculation of the HNO_3, NO_2, and H_2O content without introducing an error larger than 50% of the precision of the method. (ASTIA abstract)

PB 162 940 OTS $2.60

Naval Air Rocket Test Station, Lake Denmark, Dover, N. J.
A FIELD ANALYSIS FOR WHITE FUMING AND ANHYDROUS NITRIC ACID, by John D. Clark. Sep 52, 28p. 7 refs. Rept. no. 23; AD-2591.

DESCRIPTORS: *Nitric acid, Chemical analysis, Rocket oxidizers

A field method was developed for the assay of WFNA and anhydrous HNO_3 which depends upon the variation of the electrical conductivity of HNO_3 with H_2O and NO_2 contents. The method is usable in the range of 0 to 5% H_2O and 0 to 2.5% NO_2 and has a 0.1% accuracy for either constituent. Conductivities were measured on samples of (1) original acid, (2) 100 cc of the original acid to which 5 cc of H_2O was added, and (3) 75 cc of H_2O to which 25 cc of acid was added. A calibration chart was prepared whose coordinates correspond to the ratios of the conductivities of the samples; on the chart were superimposed 2 contour lines corresponding to the H_2O and NO_2 contents. The necessary instrumentation is described, and the anlytical procedure to be followed is outlined for making analyses. (ASTIA abstract)

AD-272 823 OTS $3.60

Narmco [Industries, Inc.] San Diego, Calif.
POTENTIAL OF FILAMENT WOUND COMPOSITES, by B. Duft, C. Y. Chia and others. Monthly progress rept. no. 11, 1-31 Jan 62, on Contract NOw-61-0623-c (FBM). Jan 62, 31p. NASA N62-12364.

DESCRIPTORS: *Filament wound construction, *Reinforcing materials, *Glass textiles, Plastics, *Epoxy resins, Fibers, *Synthetic fibers, Laminates, Deformation, Mechanical properties, Failure (Mechanics) Loading (Mechanics), Stresses, Test methods, Test equipment, *Composite materials.

Flexural rigidity, EI, of a composite was derived with various orientation of fibers. This analysis is applicable both for compressive and tensile loads. Experimental data are presented for compression specimens and tensile specimens with broken fibers. (Author) (See also AD-269 980)

PB 162 922 OTS $5.60

Naval Ordnance Lab., White Oak, Md.
IMPROVED NOL RING TEST METHOD FOR PARALLEL GLASS ROVING REINFORCED PLASTICS: EVALUATION OF CHEMICAL FINISHES, by P. W. Erickson, I. Silver, and H. A. Perry, Jr. 7 Aug 58, 52p. 1 ref. NAVORD rept. 6152; AD-206 100.

DESCRIPTORS: *Filament wound construction, Rings, Laminates, *Plastics, *Polyester plastics, *Epoxy resins, Reinforcing materials, *Glass textiles, *Finishes, Shear stresses, Tensile properties.

Several refinements in the test method proposed in NavOrd 5680 for the evaluation of certain strength properties of parallel fiber glass reinforced plastics are given. Flexural and horizontal shear data are reported on specimens from rings fabricated with 8 end roving using both polyester and epoxy resins and several surface treatments. The data show that the refinements lead to increased reliability in the test method. The refinements also have the effect of simplifying the procedure from the operator's point of view. Either flexural or horizontal shear strength properties can be utilized to evaluate the relative effectiveness of roving surface treatments. (Author)

AD-281 460 OTS $1.60

Westinghouse Electric Corp., East Pittsburgh, Pa.
RESIN SHRINKAGE RELATED TO THE PERFORMANCE OF FILAMENT WOUND STRUCTURES, by R. N. Sampson, B. Rosen and others. Rept. for 15 Apr-15 May 62, on Contract Nonr-3537(00). [1962] 15p. Technical memo. no. 183; NASA N62-13123.

DESCRIPTORS: *Filament wound construction, Laminates, *Plastics, *Quality control, *Dilatometers, *Electric motors, *Containers.

A dilatometer quality control technique was developed for use by motor case fabricators to determine the quality of resin cure obtained during the normal manufacture of filament wound motor cases. A dilatometer suitable for shop use is described. (Author)

PB 162 955 OTS $10.50

Fluor Corp., Ltd., Whittier, Calif.
DEVELOPMENT OF SAMPLING TECHNIQUES, by W. F. MacInnes. Summary rept. on Contract AF 04(611)4578. Sep 60, 131p. 21 refs. CRR no. 1049; AFFTC-TR-60-44; AD-243 247.

DESCRIPTORS: *Guided missile research, *Liquid rocket propellants, *Rocket fuels, *Rocket oxidizers, *Hydraulic fluids, *Lubricants, Gases, *Sampling, Test equipment, Fluids, Instruction manuals, *Chemical analysis, Gaseous rocket propellants, Contamination, Impurities, Propellant tanks, Storage, Liquefied gases

The report presents the results of a program aimed at providing the techniques necessary for the representative sampling of missile fluids for solid contaminants. In some cases it was necessary to develop equipment and methods not previously used. The problems involved in sampling different types of systems are discussed and the recommended solutions are presented. A discussion of the design problems associated with the fabrication of prototype equipment furnished under the contract is included, along with the fabrication drawings. (Author)

PB 162 954 OTS $4.60

Fluor Corp., Ltd., Whittier, Calif.
INSTRUCTION MANUAL FOR THE SAMPLING OF MISSILE FLUIDS, by W. F. MacInnes. Rept. on Contract AF 04(611)4578. Sep 60, 49p. 2 refs. CRR no. 1050; AFFTC-TR-60-45; AD-243 248.

DESCRIPTORS: *Liquid rocket propellants, *Rocket fuels, *Rocket oxidizers, *Hydraulic fluids, *Lubricants, Gases, *Sampling, Test equipment, Fluids, *Instruction manuals, *Guided missile research, Gaseous rocket propellants, Contamination, Impurities, Propellant tanks, Storage, Liquefied gases

Instructions are given for the operation of prototype sampling equipment for high pressure gases, cryogenic liquids, kerosene-type fuels, water and similar fluids, hydraulic oils, and semifluid lubricants in small containers. The equipment is identified and step-by-step operating instructions are provided for each sampling system so that a person previously unskilled in the art of sampling can sample the fluid systems with a minimum of supervision. (Author)

PB 162 953 OTS $6.60

Fluor Corp., Ltd., Whitier, Calif.
LABORATORY MANUAL FOR PARTICULATE MATTER ANALYSIS, by Paul H. Dutch. Rept. on Development of Sampling Techniques and Particulate Matter Analysis, Contract AF 04(611)4578. 10 Nov 59, 67p. 3 refs. CRR no. 1052; AFFTE-TR-60-47; AD-251 650.

DESCRIPTORS: *Guided missile research, *Liquid rocket propellants, *Chemical analysis, *Microscopy, Rocket fuels, Test methods, Particles, Metals, Salts, Fibers, Fluids, *Sampling, Contamination, Impurities, Colorimetric analysis

This manual describes relatively simple but effective techniques for the identification of micron-sized particles of metals, salts, fibers, and other organic materials which may be present in fluid rocket fuel systems. These techniques can be grouped into three broad classifications; chemical microscopy, visual microscopy, and microchemical spot testing. The analytical procedures required in the application of these techniques have been simplified to such an extent that they can be performed on a routine basis. The manual is a summary of the useful results obtained from the analysis portion of the project. (Author) (See also PB 162 952)

PB 162 952 OTS $7.60

Fluor Corp., Ltd., Whittier, Calif.
PARTICULATE MATTER ANALYSIS, by Paul H. Dutch. Summary rept. on Contract AF 04(611)4578. Sep 60, 78p. 36 refs. CRR no. 1051; AFFTC-TR-60-46; AD-243 249.

DESCRIPTORS: *Guided missile research, *Liquid rocket propellants, *Rocket fuels, *Rocket oxidizers, *Hydraulic fluids, *Lubricants, *Chemical analysis, *Sampling, Test equipment, Fluids, Contamination, Impurities, Propellant tanks, Storage, Gaseous rocket propellants, Gases

Procedures were developed for the identification of particle contaminants found in guided missile fluid systems. Specific methods were selected from the fields of microscopy, analytical chemistry, and chemical microscopy on the basis of accuracy, sensitivity, lack of interference, and ease of application. The techniques chosen were refined to suit the specific requirements of the AFFTC and were augmented with test aids in the form of photomicrographs, color comparators, and typical slides of contaminant samples. A laboratory manual was prepared to serve as a set of instructions for the systematic analysis of particulate matter. A laboratory kit was assembled containing the necessary reagents and tools for performing all tests covered in the manual.

NASA N63-12543 OTS $0.75

Lewis [Research Center, National Aeronautics and Space Administration] Cleveland, Ohio.
FLIGHT INVESTIGATION OF PENTABORANE FUEL IN 9.75-INCH-DIAMETER RAM-JET ENGINE WITH DOWNSTREAM FUEL INJECTION, by John H. Disher and Merle L. Jones. 22 Apr 57, declassified 17 July 62. 29p. 7 refs. Research memo. RM E55G01.

PB 162 939 OTS $1.60

Naval Air Rocket Test Station, Lake Denmark, Dover, N. J.
ANALYTICAL PROCEDURES FOR ROCKET PROPELLANTS. I. MIXED ACID. II. WHITE FUMING NITRIC ACID. III. RED FUMING NITRIC ACID, by Howard G. Streim. Apr 51, 20p. 13 refs. Rept. no. 8; ATI-119 268.

DESCRIPTORS: Rocket propellants, *Liquid rocket propellants, Acids, *Nitric acid, Chemical analysis, *Rocket oxidizers

The method of averaging over a shell is developed mathematically without the aid of the previously used assumptions of Love and Lamb. These assumptions were: (1) The state of strain is such that, given any arbitrary deformation to the middle surface, a line of particles originally normal to this surface remains straight and normal to it in the strained condition; and (2) the elongation in the direction of the normal is adjusted to give zero traction across any small area parallel to the middle surface. The application of this theory to the torsional oscillation of a circularly cylindrical shell produced results which, when compared with those of the rigorous Saint-Venant theory, show complete agreement, and indicate the inaccuracy of the Love-Lamb theory. This new analysis shows that the process of averaging over a shell is, in its very nature, semi-convergent and therefore capable only of accuracy of the second order in the thickness of the shell. This method is also applied successfully to various cases of clamped or fixed edges. (ASTIA abstract)

Aerodynamics and Pneumatics

NASA N63-12505 OTS $1.75

Ames [Research Center, National Aeronautics and Space Administration] Moffett Field, Calif.
APPROXIMATE SOLUTIONS FOR THE FLOW ABOUT FLAT-TOP WING-BODY CONFIGURATIONS AT HIGH SUPERSONIC AIRSPEEDS, by Raymond C. Savin 15 Sep 58, declassified 17 July 62. 70p. 21 refs. Research memo. RM A58F02.

NASA N63-12537 OTS $0.50

Ames [Research Center, National Aeronautics and Space Administration] Moffett Field, Calif.
LATERAL-CONTROL CHARACTERISTICS AND DIHEDRAL EFFECT OF A WING-BODY COMBINATION WITH A VARIABLE-INCIDENCE TRIANGULAR WING AND WING-TIP AILERONS AT A MACH NUMBER OF 1.52, by Richard Scherrer and David H. Dennis. 10 Jan 51, declassified 22 Aug 62. 15p. 6 refs. Research memo. RM-A50H10.

NASA N63-12534 OTS $1.50

Langley [Research Center, National Aeronautics and Space Administration] Langley [Station] Va.
BUFFET TESTS OF AN ATTACK-AIRPLANE MODEL WITH EMPHASIS ON ANALYSIS OF DATA FROM WIND-TUNNEL TESTS, by Don D. Davis, Jr. and Dewey E. Wornom. 21 Feb 58, declassified 27 Sep 62. 57p. 16 refs. Research memo. RM L57H13.

NASA N63-12551 OTS $1.00

Langley Research Center, National Aeronautics and Space Administration, Langley [Station] Va.
EFFECTS OF WING VERTICAL LOCATION ON THE STABILITY AND CONTROL CHARACTERISTICS AT A MACH NUMBER OF 2.01 OF A CANARD AIRPLANE CONFIGURATION WITH A TRAPEZOIDAL ASPECT-RATIO-3 WING, by Gerald V. Foster. Sep 59 declassified 27 Sep 62. 37p. 11 refs. Technical memo. X-44.

NASA N63-13898 OTS $4.60

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
EXPERIMENTAL INVESTIGATION OF A TRANSONIC COMPRESSOR CASCADE AND TEST RESULTS FOR FOUR BLADE SECTIONS, by James C. Emery, James C. Dunavant, and Willard R. Westphal, Jan 60, declassified, 44p. 5 refs. Technical memo. X-197.

NASA N63-12519 OTS $2.50

Langley [Research Center, National Aeronautics and Space Administration] Langley [Station] Va.
FORCE AND PRESSURE MEASUREMENTS ON SEVERAL CANOPY-FUSELAGE CONFIGURATIONS AT MACH NUMBERS 1.4. AND 2.01, by A.Warner Robins. 15 Dec 55, declassified 22 Aug 62. 108p. 7 refs. Research memo. RM L55H23.

Order from GPO $2.25 as
NAS 1.12:124

Langley Research Center, National Aeronautics and Space Administration, Langley [Station] Va.
LINEARIZED THEORY OF WIND-TUNNEL JET-BOUNDARY CORRECTIONS AND GROUND EFFECT FOR VTOL-STOL AIRCRAFT, by Harry H. Heyson. 1962, 274p. 20 refs. NASA Technical rept. R-124; NASA N63-10219.

DESCRIPTORS: Aircraft, *Short take-off planes, *Vertical take-off planes, *Ground effect, Wind tunnels, Jets, Boundary layer, Corrections, *Fluid dynamic properties, *Wake, Theory.

Interference factors are developed as a function of the degree to which the wake is deflected downward. At large wake deflections the interference may be much greater than indicated by classical theory. Methods are given for extending the present numerical results to tests involving multielement and finite-span models. The theory can be at least partially verified by means of available data. Tables of calculated interference factors are presented in NASA Technical Notes D-933, D-934, D-935, and D-936. (Author)

NASA N63-12910 OTS $3.00

Langley [Research Center, National Aeronautics and Space Administration] Langley [Station] Va.
PRESSURE DISTRIBUTIONS AND AERODYNAMIC CHARACTERISTICS OF SEVERAL SPOILER-TYPE CONTROLS ON A TRAPEZOIDAL WING AT MACH NUMBERS OF 1.61 AND 2.01, by Douglas R. Lord and K. R. Czarnecki. 26 July 56, declassified 5 June 62. 170p. 12 refs. Research memo. RM L56E22.

NASA N63-12552 OTS $0.75

Langley Research Center, National Aeronautics and Space Administration, Langley [Station] Va.
STATIC STABILITY AND CONTROL CHARACTERISTICS OF AN AIRPLANE MODEL WITH TAIL SURFACES OUTBOARD OF THE WING TIPS AT A MACH NUMBER OF 2.01, by Cornelius Driver and M. Leroy Spearman. Sep 59, declassified 27 Sep 62. 29p. 4 refs. Technical memo. X-47.

MATHEMATICS

PB 162 875 OTS $4.60

Interaction Lab., Yale U., New Haven, Conn.
FIRST DEGREE ENTAILMENTS, by Alan Ross Anderson and Nuel D. Belnap, Jr. Technical rept. no. 10 on Problem Solving and Social Interaction, Contract Nonr-609(16). Nov 61, 43p. 13 refs. AD-252 519.

DESCRIPTORS: *Reasoning, *Mathematical logic, Theory, Language, *Functional analysis.

Contents:
The system LEQ_1
Semantics
Consistency
Completeness
Undecidability
Loewenheim-Skolem theorem
LEQ_1 and EQ
First degree formulas

TID-6716 OTS $1.10

Los Alamos Scientific Lab., N. Mex.
A COMPACT EVALUATION OF A CIRCULANT AND A SET OF TRIGONOMETRIC IDENTITIES, by George A. Baker, Jr. Rept. on Contract W7405-eng-36. 1956. 4p. LADC-4415.

LA-2367(Addenda) OTS $0.50

Los Alamos Scientific Lab., N. Mex.
THE SOLUTION OF THE GENERAL LEAST SQUARES PROBLEM WITH SPECIAL REFERENCE TO HIGH-SPEED COMPUTERS, by Paul McWilliams. Rept. on Contract W7405-eng-36. 1 Nov 62, 20p. NASA N63-12173.

Computing Devices

PB 162 957 OTS $7.60

Oklahoma City AMA, Tinker AFB, Oklahoma.
MULTIPLE INPUT DYNAMIC SYSTEM ANALYSIS, by Henry P. T. Corley. Mar 60, 74p. 2 refs. AD-233 949.

DESCRIPTORS: *Computers, Simulation, *Mathematical prediction, *Differential equations, *Digital computers, Theory, *Logistics, Linear systems, *Data processing systems.

Given a time invariant multiple input linear dynamic system with much available history of the system's input and output data, a method is developed for finding empirical linear differential equations relating the input data to the output data. The method does for a dynamic system what multiple linear regression does for a static system. The heart of the proposed method lies in suitable differentiation of data in such a manner that high order derivatives are accurately approximated by impulse trains. The correlation of impulse trains is then carried out in a special manner which enables transfer functions to be derived. (Author)

AD-286 914 OTS $8.10

Stanford Electronics Labs., Stanford U., Calif.
AN ADAPTIVE LOGIC SYSTEM WITH GENERALIZING PROPERTIES, by W. C. Ridgway III. Interim technical rept. Jan-Dec 61, on Multi-Neuron Adaptive Networks, Contract AF 33(616)7726. Apr 62, 85p. 17 refs. Technical rept. no. 1556-1; SEL-62-040; ASD-TDR-62-512.

DESCRIPTORS: *Computer logic, Switching circuits, Data processing systems, Programming, Sequences, Integration, Probability, Linear systems, Nonlinear systems, Theory

Conventional methods for the synthesis of switching functions require that each function be built up by the detailed interconnection of one or more basic elements. This dissertation describes a method of realization using adaption of a general system of variable threshold devices. The desired furnction is realized by repeated application of extremely simple adaption rules which can be easily implemented. Convergence will occur if the system is capable of realizing the function, and the resulting solution has strong tendencies to be invariant to random input noise. Approximately half of the report is devoted to discussing a single variable threshold element. Systems of variable threshold elements are postulated, and are shown to be capable of realizing a larger set of functions than the single element. A similarity criterion between inputs is defined, and certain system configurations are shown to classify an unknown input signal with the most similar known signal.

MECHANICS

NASA N63-12656 OTS $1.60

Astro Research Corp., Santa Barbara, Calif.
ON ISOMETRIC DEFORMATION OF SCREW SURFACES, by G. M. Schindler. Rept. on Contract NASr-8. 29 Aug 62, 14p. 3 refs. Rept. ARC-R-72.

WAPD-T-1390 OTS $1.60

Bettis Atomic Power Lab., Pittsburgh, Pa.
PRESSURE STRESSES IN MULTI-BORE BODIES, by H. Kraus. Rept. on Contract AT(11-1)GEN-14. Sep 61, 16p. 8 refs.

WAPD-T-1408 OTS $3.60

Bettis Atomic Power Lab., Pittsburgh, Pa.
STRESSES AND DEFLECTIONS IN BUILT-IN BEAMS, by W. J. O'Donnell. Rept. on Contract AT(11-1)GEN-14. Aug 61, 40p. 3 refs.

PB 162 874 OTS $6.60

Norman Bridge Lab. [of Physics] Calif. Inst. of Tech., Pasadena.
ON THE THEORY OF VIBRATIONS OF THIN SHELLS AND PLATES, by Pearl S. Epstein. Final rept. on Physics of Suspensions and Emulsions, Contract N6onr-220(04). 31 Dec 54, 64p. 6 refs. AD-75 047.

DESCRIPTORS: *Cylindrical bodies, Elastic shells, *Sheets, *Vibration, Elasticity, Mechanics, Theory.

Stress distribution in the weld zone: Stress conditions induced at the weld interface under normal force plus transverse force before slip were analyzed. The resolved transverse or "in-plane" stress in the weld area toward which the transient vibratory force acted was compressive; the zone of maximum shearing stress was under the influence of the normal stress which also was compressive. The actual accomplishment of bonding seemed to be effected in a zone of triaxial compression, which was not likely to produce cracks. In the area where the shearing stress was nearly zero and where there appeared to be no stresses productive of local slip and bonding, the transverse stress was tensile. The normal stress was essentially zero where the "in-plane" stress was a maximum tensile value. Analyses of stresses after slip and just underneath the tip-work interface are also presented. Material properties and weldability: Various materials are being investigated to determine their ultrasonic weldability capabilities. Interfacial disturbance and metal displacement: Al alloy 2014-T6 and 302 stainless steel were studied to gain information on the annular bond zone. Appendix A: Note on complete photoelastic stress analysis.

PB 162 890 OTS $5.60

Chromalloy Corp., White Plains, N. Y.
EXPLOSIVE FORMING OF REFRACTORY METALS, by Richard L. Wachtell. Bi-Monthly rept. no. 2, 31 Aug-31 Oct 59, on Contract NOas 59-6265-c. 1 Sep 59, 54p. AD-231 924.

DESCRIPTORS: *Refractory materials, *Explosive forming, Molybdenum, Molybdenum alloys, Titanium alloys, Stainless steel, Niobium, Tantalum, Tungsten, Explosives, Tensile properties, Stresses.

Dies and firing fixtures designed in the previous report period (PB-159 952) were completed and put into use. Fifty-three (53) detonations were carried out using pure molybdenum, 1/2% Ti-moly alloy and 17-7PH stainless steel; three different explosives; two transmission mediums and two temperatures. The results indicated that molybdenum and 1/2% Ti-moly alloy do not form satisfactorily at ambient temperature under the conditions used. However, at 200° to 212° F substantial elongation and plastic deformation occurred and much better forming was achieved. Tensile strength, yield strength and elongation measurements made on the first lot of Universal Cyclops 1/2% Ti-moly are presented. (Author)

PB 162 891 OTS $2.60

Chromalloy Corp., White Plains, N. Y.
EXPLOSIVE FORMING OF REFRACTORY METALS, by Roger Harvey. Bi-monthly rept. no. 3, 31 Oct-31 Dec 59, on Contract NOas 59-6265-c. 1 Jan 60, 30p. AD-237 665.

DESCRIPTORS: *Refractory materials, *Explosive forming, Molybdenum, Molybdenum alloys, Titanium alloys, Explosives, Tensile properties, Tantalum, Tungsten, Stresses, Stainless steel, Niobium.

Sixty-four tests were made with pure Mo and 1/2% Ti-Mo alloy at firing temperature from 212° to 740°F with explosive charges ranging from 1g of RDX to 45g of 15% dynamite and 45g of RDX. Three-hundred-twenty-five mesh powdered alumina were used as an energy transmitting medium in 34 tests, 200 mesh synthetic mica were used in 16 tests, water was used in 7 tests, and 140 mesh glass beads were used in 7 tests. The detonation velocities ranged from 2000 to 8000 m/sec. Improved results of the forming process were obtained since only 14 fractured and no shattered units were found. A consistent 8% elongation was achieved. In 3 tests of pure Mo, an elongation of 12.5% was obtained without fracture of the metal with 20g of RDX at 430°F and with 30g of RDX at 600°F, fracturing occurred with 30g of RDX at 430°F. At firing temperatures of 200°F, elongations of 4 to 6.5% were obtained with explosive charges ranging from 1 to 15g, fracturing occurred when the explosive weight was about 15g. In the 400°F range, elongations were 6 to 12.5% with explosive weights ranging from 15 to 35g depending upon the blank thickness. Fracturing occurred with 35 to 40g of explosive. (ASTIA abstract) (See PB 162 890)

UCRL-6452(Pt. II) OTS $1.60

Lawrence Radiation Lab., U. of California, Livermore.
STUDIES OF BISMUTH ALLOYS. II. DISTRIBUTION OF SMALL ADDITIONS OF Cu, Ag, OR Au BETWEEN SOLID AND LIQUID PHASES IN Bi-Cu, Bi-Ag, AND Bi-Au, by Marcel W. Nathans and Marjorie Leider. Rept. on Contract W7405-eng-48. 23 May 61, 15p. 15 refs.

AD-283 470 OTS $6.60

Naval Weapons Lab., Dahlgren, Va.
FRACTURE TOUGHNESS OF H-11, 300M AND D6C STEELS USED IN EXPERIMENTAL SOLID-PROPELLANT ROCKET MOTOR CASINGS AT THE 240,000 PSI YIELD STRENGTH LEVEL AND COMPARISON WITH HYDROSTATIC BURST TEST RESULTS, by H. E. Romine. 24 Aug 62, 67p. 12 refs. NWL rept. no. 1825; NASA N62-17448.

DESCRIPTORS: *Rocket cases, *Tool steel, *Stainless steel, Tests, Rocket motors, Solid rocket propellants, Grain structures (Metallurgy), Photographic analysis, Density, Fatigue (Mechanics), Physical properties, Stresses, Pressure, Rupture, Failure (Mechanics), Hydrostatic pressure, Fracture (Mechanics).

Fracture toughness tests were made on cylinder wall samples of steels representing the following IRBM rocket stages: (1) second stage of H-11 steel, 0.064 inch wall thickness; (2) first stage made of 300M steel, 0.123 inch wall thickness and (3) subscale second stage of D6C steel 0.047 inch thick. These cases represented experiments to reduce weight in steel case design by raising the yield strength level to 240,000 psi. Specimens were taken from vessels burst by hydrostatic pressure. It was found that $\mathcal{K}_c$ * toughness, against propagation of fracture started from fatigue cracks, was low in H-11, intermediate in 300M and high in D6C steel as fabricated for motor cases. Notch sharpness affected $\mathcal{K}_{Nc}$ values for fracture initiation. In hydrostatic tests all vessels had developed wall stresses in the vicinity of yield strength. (Author)

NASA N63-13897 OTS $5.60

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
USE OF EXPERIMENTAL STEADY-FLOW AERODYNAMIC PARAMETERS IN THE CALCULATION OF FLUTTER CHARACTERISTICS FOR FINITE-SPAN SWEPT ON UNSWEPT WINGS AT SUBSONIC, TRANSONIC, AND SUPERSONIC SPEEDS, by E. Carson Yates, Jr. Jan 60, declassified 1 Apr 63. 52p. 15 refs. Technical memo. X-183.

PB 162 931 OTS $2.60

Naval Ordnance Lab., White Oak, Md.
NEW EXPERIMENTAL INVESTIGATIONS ON BASE PRESSURE IN THE NOL SUPERSONIC WIND TUNNELS AT MACH NUMBERS 1.2 TO 4.24, by H. Kurzweg. 23 Jan 50, 22p. 4 refs. Rept. no. NOLM 10113.

DESCRIPTORS: Ordnance Laboratories, *Supersonic wind tunnels, Wind tunnels, *Pressure, Experimental data, Mach number.

A plausible explanation for the apparent discrepancy between the results from former wind-tunnel measurements and free-flight tests has been found. The disagreement of the former results was caused by nonsimilar flow conditions. A new effect caused by the heat flow from the model to the air and vice versa on the base pressure has been observed. Furthermore, measurements on circular discs show that at all Mach numbers covered (1.2 to 3.24) a dependence of the base pressure on the diameter of the disc exists. (Author)

PB 162 977 OTS $2.60

Naval Ordnance Lab., White Oak, Md.
A SYSTEMATIC STUDY OF A VARIABLE AREA DIFFUSER FOR SUPERSONIC WIND TUNNELS, by J. L. Diggins and A. H. Lange. Dec 52, 30p. 12 refs. NAVORD rept. 2421.

DESCRIPTORS: *Supersonic wind tunnels, Wind tunnels, *Diffusers, *Supersonic diffusers, Tests, Pressure.

A diffuser of variable geometric shape was tested for pressure recovery at Mach numbers 1.9, 2.5, 2.8, and 4.9 in the continuous NOL 18 x 18 cm Aerophysics Tunnel No. 3. The diffuser consisted of a converging-diverging, two-dimensional, variable-area duct. The opening of the diffuser throat and the location of the throat along the center line of the duct was varied systematically during the tests. Furthermore, the effect of closed or half open test section on diffuser efficiency and that of a model in the air stream were investigated. Operating and starting pressure ratios of the wind tunnel were determined and performance data of the diffuser are given for both cases.

PB 162 920 OTS $5.60

Naval Ordnance Lab., White Oak, Md.
WAKE INVESTIGATION ON SHARP AND BLUNT NOSE CONES AT SUPERSONIC SPEEDS, by R. Lehnert and V. L. Schermerhorn. 28 Jan 58, 59p. 12 refs. NAVORD rept. 5668; Aerodynamics Research rept. 8; AD-231 112.

DESCRIPTORS: *Conical bodies, Blunt bodies, *Supersonic flow, Boundary layer, Pressure, Wind tunnel models, Wake, Supersonic wind tunnels, Measurement.

A study was made of the relationships between given local flow conditions at the downstream end of cones in supersonic flow and the corresponding base pressure and wake configuration. The models chosen for this investigation were a 10^{o} semi-apexangle, sharp cone and a 10^{o} semi-apex angle, sphere cone. Surface pressure distribution and base pressure measurements were made as well as total-pressure surveys of the wake and the boundary-layer near the base. All of the measurements were taken at zero angle of attack. The boundary-layer development along the cone surfaces was calculated for each case tested in the wind tunnel. The momentum thickness Reynolds numbers at the end of the cones derived from these calculations were in good agreement with the ones obtained from the boundary-layer surveys. It was established that the base pressure and the wake angle are the same for sharp and blunt nose cones of the same half angle when the local Mach number and the Reynolds number based on boundary-layer momentum thickness at the downstream end of the cones are the same. (Author)

PB 162 896 OTS $4.60

[Office of Research Administration] U. of Michigan, Ann Arbor.
TRANSPORT PHENOMENA IN VERY DILUTE GASES, by C. S. Wang Chang and G. E. Uhlenbeck. 15 Nov 49, 46p. 8 refs. APL/JHU rept. no. CM-579; ATI-68 212.

DESCRIPTORS: *Gases, Dynamics, *Transport properties, Gas flow, Drag, *Flat plate models, *Thermodynamics, Integral equations, Heat transfer.

In the study of the transport phenomena in gases, the two extreme cases of the so-called Clausius gas and the so-called Knudsen gas are usually considered. For the Clausius regime a systematic successive approximation method is given by the well-known Hilbert Enskog development. In this report the Knudsen gas regime is considered. A systematic successive approximation method will be the successive collision method which corresponds mathematically to the Neumann development for the solution of the integral equation. Two simple cases are considered: the heat flux between two parallel plates at different temperatures, and the drag on one of two parallel plates when one of them is moving with a given velocity while the other is kept stationary. The results obtained for these two cases are discussed, as well as the effect of imperfect accommodation.

METALLURGY

PB 162 892 OTS $3.60

Aeroprojects, Inc., West Chester, Pa.
FUNDAMENTALS OF ULTRASONIC WELDING, PHASE II, Bimonthly progress rept. no. 3, 16 Apr-15 June 59, on Contract NOas 59-6070-c. 15 June 59, 40p. 14 refs. AD-226 535.

DESCRIPTORS: *Welding, *Ultrasonics, Ultrasonic radiation, *Photoelasticity, *Stresses, *Welds, Shear stresses, Aluminum, Stainless steel.

was achieved by coating the rolls with a lubricant containing 1 part light machine oil and 10 parts acetone. The best results were obtained with -0.003, 0.000, and 0.003-in. roll openings with 200B powders and 0.003- and 0.006-in. roll openings with 40B powders. The oxide coatings on the as-received Pb powder were thought to be the cause for the superior properties obtained by direct powder rolling. Corrosion resistance of the products was superior to the cast-wrought product. (See also PB 162 958)

PB 162 960 OTS $5.60

Storchheim Research and Development Corp., Woodside, N. Y.
LEAD SHIELDING. Interim rept. no. 3, 30 June 59-30 June 60, on Contract NOas 59-6249-c. [1960] 56p. AD-234 925.

DESCRIPTORS: *Lead, Powders, *Powder metallurgy, Mechanical properties, *Shielding, Tensile properties, Creep, Corrosion, X-ray diffraction analysis, Rolling mills

The data are a representative evaluation of numerous physical and mechanical tests carried on with lead strip directly rolled from Glidden 40B and 200B lead powders. Ultimate tensile strength, elongation, yield strength, modulus of elasticity, stress-rupture, creep, x-ray diffraction, corrosion and other tests have been carried out and are in progress. Generally these indicate the powder rolled product is superior to the cast-wrought product. Investigations have been made as to the effect of rolling speed and lubrication on various commercial lead powders as well as statistical studies and the effect of time on powder lead strip. Results indicate speed is a vital parameter and is related to particle size. The smaller the particle; the slower must the roll speed be. In conjunction with this, the roll surfaces have to be properly lubricated to prevent sticking of the Pb to the rolls. Said lubrication must also allow for adequate volume "pull-in" of the powder between the rolls to assure high compacting pressure application. Statistical checks indicate properties are uniform within a strip and among strips. Likewise time does not appear to allow for a degeneration of strip properties. (Author) (See also PB 162 959)

PB 162 961 OTS $4.60

Storchheim Research and Development Corp., Woodside, N. Y.
LEAD SHIELDING. Interim rept. no. 4, 30 June 59-30 June 60, on Contract NOas 59-6249-c. [1960] 46p. AD-237 797.

DESCRIPTORS: *Lead, Powders, *Powder metallurgy, Mechanical properties, *Shielding, Tensile properties, Creep, Corrosion, X-ray diffraction analysis, Rolling mills

The rollability and the mechanical properties of lead strip fabricated from various types of Pb powders, fibers, and ribbon were investigated. While strip could be produced from fibers and ribbon, these materials did not flow well. The rolling of 200B lead powder at a speed of 2.5 fpm yielded better strip than that produced at a rolling speed of 15.7 fpm; the tensile strength was higher and the elevated stress-rupture properties were improved. The production of Pb plate is feasible by hot sheath rolling of Pb powders. Powder-rolled Pb strip responded to cold working which resulted in increased mechanical properties both at room and elevated temperatures. There was little decrease in the tensile strength of powder-rolled Pb strip when heat treated in air at 225°C. The creep resistance of 40B powder-rolled Pb strip at 300°F was better than that of 200B powder-rolled strip. X-ray diffraction patterns indicated that preferred orientation in the powder-rolled Pb product was negligible. (See also PB 162 960)

PB 162 962 OTS $1.60

Storchheim Research and Development Corp., Woodside, N. Y.
LEAD SHIELDING. Interim rept. no. 5, 30 June 59-30 June 60, on Contract NOas 59-6249-c. [1960] 18p. AD-237 798.

DESCRIPTORS: *Lead, Powders, *Powder metallurgy, Mechanical properties, Heat treatment, Tensile properties, Rolling mills, *Shielding.

A large number of samples of 200 B and 40 B lead strip were prepared. Modifications in rolling procedures indicated that a rearrangement of the hopper feeding practically eliminated bowing and crowning of the strip when 200 B lead powder was used. A lacquer spray lubricant, continuously applied to the rolls during rolling, provided excellent lubrication and prevented bonding of 40 B lead powder to the rolls. A prealloyed 99/1 Pb/Al_2O_3 powder was successfully compacted into strip. Ultimate tensile strength values were of the order of 4000 psi, but elongations were low (about 1%). Heat treatment at 200°C for 30 min increased elongations to about 2%. (See also PB 162 961)

PB 162 963 OTS $5.60

Storchheim Research and Development Corp., Woodside, N.Y.
LEAD SHIELDING. Final rept. 30 June 59-30 June 60, on Contract NOas 59-6249-c. [1960] 67p. AD-240 069.

DESCRIPTORS: *Lead, Powders, *Powder metallurgy, Mechanical properties, *Shielding, Creep, Corrosion, Crystal structure, Rolling mills.

This report summarizes the results of an experimental investigation of direct powder rolling as applied to the fabrication of lead strip. It was found that powder fabricated lead strip is several times as strong as the cast-wrought product, is many times as creep resistant and possesses better corrosion resistance to concentrated sulfuric acid. Processing variables such as powder characteristics, powder feeding techniques, roll lubrication, rolling speed, cold reduction and heat treating were investigated and related where possible to the mechanical properties of the strip. Strip properties investigated included ultimate tensile strength and elongation at room temperature, stress rupture characteristics and creep resistance at room and elevated temperature, modulus of elasticity, yield strength and corrosion resistance to various acid media. (Author) (See also PB 162 962)

PB 162 910 OTS $1.10

New England Materials Lab., Inc., Medford, Mass.
HARD PARTICLE STRENGTHENING OF REFRACTORY METALS FOR HIGH TEMPERATURE USE THROUGH INTERNAL OXIDATION, by K. M. Zwilsky and N. J. Grant. Progress rept. no. 1, 1 July-31 Aug 59, on Contract NOas 59-6223-c. [1959] 6p.

DESCRIPTORS: *Heat resistant alloys, *Molybdenum alloys, *Niobium alloys, *Titanium alloys, Tinsile properties, Hardness, Oxidation, Particles, *Dispersion hardening

Two molybdenum base materials containing 0.45 weight percent columbium and 0.49 weight percent titanium, respectively, have been received. Experiments have been started on small solid samples of these alloys to attempt to internally oxidize the solute elements. (Author)

PB 162 912 OTS $1.60

New England Materials Lab., Inc., Medford, Mass.
HARD PARTICLE STRENGTHENING OF REFRACTORY METALS FOR HIGH TEMPERAUTRE USE THROUGH INTERNAL OXIDATION, by A. S. Bufferd, K. M. Zwilsky, and N. J. Grant. Progress rept. no. 3, 1 Nov-31 Dec 59, on Contract NOas 59-6223-c. [1960] 12p. 2 refs. AD-237 955.

DESCRIPTORS: *Heat resistant alloys, *Molybdenum alloys, *Titanium alloys, *Oxidation, Extrusion, Tensile properties, Hardness, Particles, *Dispersion hardening

Oxidation of a molybdenum-0.5% titanium alloy has been studied at 1200°F for various time periods up to 100 hours. The time of oxidation, oxygen pressure and degree of preheating of the gas phase were found to be important variables in the weight gain observed on a number of specimens. This same alloy was machined into chips which are now being completely oxidized followed by hydrogen reduction to give fine titanium dioxide particles in a matrix of pure molybdenum. Extrusion of an alloy containing the as-received chips is currently in progress to check on extrusion variables and to serve as a base line for comparison. (Author)

PB 162 913 OTS $4.60

New England Materials Lab., Inc., Medford, Mass.
HARD PARTICLE STRENGTHENING OF REFRACTORY METALS FOR HIGH TEMPERATURE USE THROUGH INTERNAL OXIDATION, by A. S. Bufferd, K. M. Zwilsky, and N. J. Grant. Final rept. 1 July 59-30 June 60, on Contract NOas-59-6223-c. [1960] 49p. 8 refs. AD-245 401.

DESCRIPTORS: *Molybdenum alloys, *Oxidation, *Titanium alloys, *Niobium alloys, *Heat resistant alloys, Powder metallurgy, Sintering, Extrusion, Hardening, Oxides, Temperature, Pressure, Oxygen, Penetration, Mechanical properties, *Dispersion hardening.

Molybdenum-0.5% titanium, molybdenum-1.5% titanium, and molybdenum-0.5% columbium were hard particle strengthened by internal oxidation. Superior properties, as measured by stress-rupture tests at 1800 degrees F, were obtained with alloy chips after compacting, sintering, and extruding. The process of chipping the alloys increased the surface area to such an extent that there was enough oxygen, due to surface oxidation, for internal oxidation during the subsequent sintering treatment. The 100 hour rupture life for extruded Mo-0.5% Ti chips was 60,000 psi versus 50,000 psi for the arc cast material. For the Mo-1.5% Ti composition, the 100 hour rupture life was 54,000 psi for the extruded chips versus 22,000 psi for the as received bar stock. Electron microscopy was used in evaluating the resulting structures. (Author) (See also PB 162 912)

PB 162 958 OTS $3.60

Storchheim Research and Development Corp., Woodside, N. Y.
LEAD SHIELDING. Interim rept. no. 1, 30 June 59-30 June 60, on Contract NOas 59-6249-c. [1960] 40p. AD-227 423.

DESCRIPTORS: *Lead, Powders, *Powder metallurgy, Production, Mechanical properties, *Shielding, Rolling mills.

The program undertaken involves the development of direct powder rolling techniques for the fabrication of high strength lead strip for use as a radiation shielding material and subsequent production of strip at a pilot plant level. The properties of strip produced from different grades of powders were investigated. Factors such as rolling speed, roll opening and lubrication were examined. Significant increases in ultimate tensile strength and ductility were obtained. From the experiments done so far, it can be said that roll opening during rolling has a bearing on mechanical characteristics of the strip produced. The effect of mesh fraction and oxygen content of the material was also studied. Most of the data obtained during this period was on Glidden 40B grade and 200B grade lead powders. Powders from Metals Disintegrating, their grade MD101, will also be obtained and test results on strips compared. Procedures for the control tests on powders to be used for rolling have been established and also a manual for rolling of powders is set-up. (Author)

PB 162 959 OTS $3.60

Storchheim Research and Development Corp., Woodside, N. Y.
LEAD SHIELDING. Interim rept. no. 2, 30 June 59-30 June 60, on Contract NOas 59-6249-c. [1960] 35p. AD-229 606.

DESCRIPTORS: *Lead, Powders, *Powder metallurgy, Rolling mills, Production, Mechanical properties

Two Glidden Pb powders (40B and 200B), were successfully utilized in direct powder rolling. The 200B powder, a fine powder, was rolled at mill openings of -0.006, -0.003, 0.000, 0.003, and 0.006 in. at a roll speed of 15.7 fpm. In each case the strip showed excellent surface appearance and reproducibility. The rolling of 40B Pb powder, a course powder, was limited to roll openings of 0.003 and 0.006 in. at a roll speed of 15.7 rpm; attempts to roll 40B at openings of less than 0.003 in. were not successfu. The direct rolling of 40B Pb powder

PB 162 902 OTS $1.60

Mellon Inst. [of Industrial Research, Pittsburgh, Pa.] STRESS CORROSION OF HIGH STRENGTH STEELS AND ALLOYS; ARTIFICIAL ENVIRONMENT, by C. J. Owen and W. D. Ruble. Monthly scientific progress rept. (Rept. no. 4) for Oct 60, on Contract DA 36-034-ORD-3277RD. 28 Nov 60, 16p. 2 refs. AD-246 889.

DESCRIPTORS: *Steel, *Alloys, *Corrosion, Stresses, *Titanium alloys, *Cobalt alloys, Rocket cases, Atmosphere, Simultation, Industrial research, Military research, Tests, Physical properties.

About 30 stress corrosion test tanks were fabricated from galvanized sheet, soldered to prevent leakage, and phosphate coated for good coating adhesion; they are being coated on the inside with an epoxy resin. The alloys selected for test include (1) low alloy, Ladish D6Ac; (2) Si-modified 4300 series, 300M; (3) hot-worked die steel, Vascojet 1000; (4) cold-worked PH steel, AM355; (5) heat-treated PH steel, PH15-7Mo; and (6) Ti alloy, B120VCA. The cold-worked austentic steels were omitted since no appreciable quantities are being used for rocket motor cases or similar vehicles. Pyrex gas bottles are being fabricated for aging Ti-alloy tensile and U-bend specimens. Physical and chemical property data are presented for bent-beam specimens of 4137 Co steel being subjected to atmospheric exposure tests. The cumulative U-bend stress corrosion test results are presented for 4137 Co samples exposed to aqueous, 1M NaCl, Na_2SO_4, and $NaNO_3$ test solutions. This material appears more prone to failure in nitrate and sulfate environments than in a chloride environment. (ASTIA abstract) (See also PB 162 901)

PB 162 903 OTS $1.60

Mellon Inst. [of Industrial Research, Pittsburgh, Pa.] STRESS CORROSION OF HIGH STRENGTH STEELS AND ALLOYS; ARTIFICIAL ENVIRONMENT, by C. J. Owen and W. D. Ruble. Monthly scientific progress rept. (Rept. no. 5) for Nov 60, on Contract DA 36-034-ORD-3277RD. 20 Dec 60, 16p. AD-248 188.

DESCRIPTORS: *Steel, *Alloys, *Corrosion, Corrosion research, Industrial research, Cobalt alloys, Rocket cases, Guided missiles, *Titanium alloys, *Corrosion resistant alloys, Military research, Tests, Stresses, Physical properties.

U-bend stress corrosion tests on the available missile steel (4137 Co) were conducted. Bent beam samples of 4137 Co steel were prepared and heat treated for exposure to a heavy industrial environment. Physical test results of the tensile specimens heat treated simultaneously with the bent beam samples are presented, including offset yield, tensile and fracture strengths, and hardness and elongation measurements. Initial cumulative data for the bent beam tests at Kure Beach, N.C., and Monroeville, Pa., on the alloy are also presented. Cumulative stress corrosion test results for the U-bend 4137 Co specimens exposed to aqueous one molar NaCl, Na_2So_4 and $NaNO_3$ are presented. For NaCl there were 6 failures at 550 degrees F during 0.5 to 11.5 days; at 750 and 1100 F no failures were reported after 132 days. For Na_2SO_4 there were 6 failures at 550 F during a period between 10 min and 2.5 days; at 750 and 1100 F no failures were reported after 72 days. For $NaNO_3$ there were 6 failures at 550 F between 0.5 and 1.5 days, 6 failures at 750 F between 29.5 and 39.5 days, and 3 failures up to 72 days at 1100 F. (ASTIA abstract) (See also PB 162 902)

PB 162 904 OTS $1.60

Mellon Inst. [of Industrial Research, Pittsburgh, Pa.] STRESS CORROSION OF HIGH STRENGTH STEELS AND ALLOYS; ARTIFICIAL ENVIRONMENT, by C. J. Owen and W. D. Ruble. Quarterly scientific progress rept. (Rept. no. 6) 1 Oct-31 Dec 60, on Contract DA 36-034-ORD-3277RD. 17 Jan 61, 19p. AD-249 930.

DESCRIPTORS: *Steel, *Titanium alloys, Corrosion research, Rocket cases, *Corrosion, Stresses, Corrosion inhibition, Alloys, Corrosion resistant alloys, Heat treatment, Sodium compounds, Chlorides, Atmosphere. Solutions, Test methods, Test equipment, Physical properties.

This report presents further information on apparatus construction, heat treatment procedures and results on continuing U-bend and bent beam tests for 4137 Co missile steel. (Author) (See also PB 162 903)

PB 162 905 OTS $1.60

Mellon Inst. [of Industrial Research, Pittsburgh, Pa.] STRESS CORROSION OF HIGH STRENGTH STEELS AND ALLOYS; ARTIFICIAL ENVIRONMENT, by C. J. Owen and W. D. Ruble. Monthly scientific progress rept. (Rept. no. 7) Jan 61, on Contract DA 36-034-ORD-3277RD. 15 Feb 61, 17p. AD-251 183.

DESCRIPTORS: *Steel, *Titanium alloys, Rocket cases, Corrosion research, *Corrosion, Stresses, Sodium compounds, Corrosive gases, Salts, Corrosive liquids, Tests, Physical properties.

Cumulative U-bend stress corrosion test results are tabulated for 4137 Co steel samples exposed to aqueous 1-molar NaCl, Na_2SO_4, $NaNO_3$, $NaPO_3$, and Na_2S solutions. This steel appears highly sensitive to a phosphate environment and is more prone to failure in nitrate and sulfate environments than in a chloride environment. The phosphate environment test results indicate that the use of a phosphate base coating prior to painting a missile steel surface could cause early failure of the steel when subjected to moderate to high stresses. U-bend test results on a high strength titanium alloy (B120 VCA), sample preparation, and physical property test results of samples from 3 heats of a hot-worked, high strength die steel (Vascojet 1000) are discussed. (ASTIA abstract) (See also PB 162 904)

PB 162 906 OTS $2.60

Mellon Inst. [of Industrial Research, Pittsburgh, Pa.] STRESS CORROSION OF HIGH STRENGTH STEELS AND ALLOYS; ARTIFICIAL ENVIRONMENT, by C. J. Owen and W. D. Ruble. Monthly scientific progress rept. (Rept. no. 8) Feb 61, on Contract DA 36-034-ORD-3277RD. 16 Mar 61, 22p. AD-252 677.

DESCRIPTORS: *Steel, *Titanium alloys, Rocket cases, Corrosion research, *Corrosion, Stresses, Sodium compounds, Salts, Tests, Corrosive liquids, Corrosive gases, Physical properties.

Cumulative bent beam and U-bend stress corrosion test results on a high strength, low alloy steel (4137 Co) exposed to seven synthetic and four natural environments are discussed. In addition, continuing U-bend test results on a high strength titanium alloy (B120 VCA) exposed to three synthetic environments and initial exposure of a cold-worked PH alloy (AM 355) to stress

Y-1409 OTS $0.50

Union Carbide Nuclear Co., Oak Ridge, Tenn. SHORT-ARC WELDING OF HASTELLOY N (INOR-8), by H. B. Harlan and V. B. Gritzner. Rept. on Contract W7405-eng-26. 17 Aug 62, 24p. 4 refs. NASA N63-12636.

Structural Metallurgy and Corrosion

PB 162 885 OTS $3.60

Massachusetts Inst. of Tech., Cambridge. AN INVESTIGATION OF THE SYSTEMS FORMED BY CHROMIUM, MOLYBDENUM AND NICKEL, by David S. Bloom and Nicholas J. Grant. [Rept. on Contract NOas-8784. 1953] 34p. 7 refs. AD-19 955.

DESCRIPTORS: *Heat resistant alloys, *Molybdenum alloys, *Chromium alloys, *Nickel alloys, *Phase studies, Annealing, Cold working.

An investigation of the Mo-Ni system resulted in some changes in the phase diagram in the regions of the eutectic and peritectic reactions. Interesting phenomena concerning the intermediate structure associated with the eutectoid reaction were revealed by the investigation of the Cr-Ni system. The retained high-temperature phase could be decomposed by annealing or cold-working near room temperature. The Cr-Mo system as presently accepted was considered incorrect. Suggestions were made for possible changes of the diagram. The 1250°C section of the Cr-Mo-Ni system was developed which shows the shape of the σ phase field at this temperature. The existence of another ternary compound called the P phase was corroborated. The liquidus surface of the ternary was outlined, and a possible system of invariant planes for the ternary system Cr-Mo-Ni was suggested. (ASTIA abstract)

PB 162 899 OTS $1.60

Mellon Inst. [of Industrial Research, Pittsburgh, Pa.] STRESS CORROSION OF HIGH STRENGTH STEELS AND ALLOYS; ARTIFICIAL ENVIRONMENT, by C. J. Owen and W. D. Ruble. Monthly scientific progress rept. (Rept. no. 1 for July 60, on Contract DA 36-034-ORD-3277RD. 19 Aug 60, 15p. 2 refs. AD-241 418.

DESCRIPTORS: *Steel, Rocket cases, Airframes, *Corrosion, Stresses, Mechanical properties, *Titanium alloys, Heat treatment, Test methods, Sodium compounds, Chlorides, Solutions, *Stainless steel, Failure (Mechanics), Alloys, Atmosphere, Corrosion inhibition.

A study was begun on the effect of stress corrosion on high-strength steels and alloys in synthetic or artificial environments. The following classes of rocket motor case materials will be investigated: (1) low alloy martensitic steel, (2) Si-modified 4300 series steel, (3) hot-worked die steel, (4) cold-worked PH steel, (5) precipitation hardening stainless steel, and (6) high-strength Ti alloy. Eighteen specimens of a 4137 Co steel were austenitized in an NaCl bath for 1/2 hr at 1700°F. Six specimens were tempered at 550°; 6 at 750°; and 6 at 1100°F for 2 hr followed by an air quench. The second temper lasted for 1 hr with an air quench. After a surface treatment with 80- and 120-grit paper to remove all oxide and scale, the specimens were bent into a U-shape, positioned in a holder of identical material, and totally immersed in an aerated 1 M NaCl solution.

PB 162 900 OTS $8.10

Mellon Inst. [of Industrial Research, Pittsburgh, Pa.] STRESS CORROSION OF HIGH STRENGTH STEELS AND ALLOYS; ARTIFICIAL ENVIRONMENT, by C. J. Owen and W. D. Ruble. Monthly scientific progress rept. (Rept. no. 2) for Aug 60, on Contract DA 36-034-ORD-3277RD. 28 Sep 60, 88p. 118 refs. AD-243 837.

DESCRIPTORS: *Steel, *Stainless steel, *Alloys, Austenite, Martensite, Guided missiles, Stresses, *Corrosion, Tests, Failure (Mechanics), Titanium, *Titanium alloys, Coatings, Aircraft, *Bibliography, Fracture (Mechanics), Mechanical properties.

A brief summation of the information obtained from a search of the industrial research literature on stress corrosion cracking, published over the previous four to five years, is presented. The pertinent abstracts accompany the 118 references. While sample material procurement and experimental set-up work are continuing, the U-bend testing of an available low alloy missile steel is being conducted in the laboratory. (Author) (See also PB 162 899)

PB 162 901 OTS $3.60

Mellon Inst. [of Industrial Research, Pittsburgh, Pa.] STRESS CORROSION OF HIGH STRENGTH STEELS AND ALLOYS; ARTIFICIAL ENVIRONMENT, by C. J. Owen and W. D. Ruble. Quarterly scientific progress rept. (Rept. no. 3) 1 July-30 Sep 60, on Mellon Inst. Fellowship no. 389-1, Contract DA 36-034-ORD-3277RD. 24 Oct 60, 38p. 55 refs. AD-245 069

DESCRIPTORS: *Steel, *Alloys, Airframes, *Corrosion, Stresses, *Stainless steel, Rocket cases, Bibliography, Atmosphere, Simulation, Tests, Industrial research, Military research, Test equipment, *Cobalt alloys.

U-bend corrosion tests conducted with 4137 Co (missile steel) material indicated that glass suspension rods and glass containers are impractical since they were both shattered by sudden failure of the sample material during testing. Metal containers were designed for testing both the U-band and bent beam samples. A review of prior work was made together with a summation of information obtained from a literature search of ASTIA reports published over the past 4 to 5 years in the ASTIA Technical Abstract Bulletins. The 55 bibliographical references which represent military research are presented alphabetically by author or originating agency. The survey indicated that little information is available on the stress-corrosion susceptibility of high-strength steels and alloys. (ASTIA abstract) (See also PB 162 900)

UCRL-7001 OTS $2.25

Lawrence Radiation Lab., U. of California, Livermore.
HIGH ENERGY BREMSSTRAHLUNG FROM PROTON-NUCLEUS COLLISIONS, by Walter C. Beckham. Thesis. Rept. on Contract W7405-eng-48. 15 Aug 62, 98p. 13 refs. NASA N63-12423.

UCRL-10531 OTS $2.75

Lawrence Radiation Lab., U. of California, Berkeley.
NUCLEAR REACTIONS INDUCED BY PIONS AND PROTONS, by Paul L. Reeder. Doctoral thesis. Rept. on Contract W7405-eng-48. 27 Nov 62, 180p. 99 refs. NASA N63-12422.

LAMS-2801 OTS $1.25

Los Alamos Scientific Lab., N. Mex.
A CODE FOR REDUCING MANY-GROUP CROSS SECTIONS TO FEW GROUPS, by Ralph S. Cooper. Rept. on Contract W7405-eng-36. Dec 62, 52p. Supersedes LAMS-2747.

TID-15359 OTS $1.10

National Lead Co. of Ohio, Cincinnati.
AN IMPROVED PROCEDURE FOR THE DETERMINATION OF U^{235} IN IMPURE URANIUM MATERIALS USING NEUTRON ACTIVATION TECHNIQUES, by W. D. Kelley and B. L. Twitty. [Rept. on Contract AT(30-1)1156]. 8p. 3 refs. [1958].

NLCO-865 OTS $1.25

National Lead Co. of Ohio, Cincinnati.
SUMMARY TECHNICAL REPORT FOR THE PERIOD 1 OCTOBER-31 DECEMBER 1962. Rept. on Contract AT(30-1)1156. 1 Feb 63, 48p. 12 refs.

NBL-189 OTS $0.50

New Brunswick Lab., N. J.
SEPARATION AND DETERMINATION OF PLUTONIUM IN PLUTONIUM-URANIUM FUEL ELEMENTS, by C. E. Petri. Jan 63, 6p. 6 refs. NASA N63-12401.

ORNL-3298 OTS $0.50

Oak Ridge National Lab., Tenn.
RECOVERY OF PuF_6 BY FLUORINATION OF FUSED FLUORIDE SALTS, by G. I. Cathers and R. L. Jolley. Rept. on Contract W7405-eng-26. [1961] 16p. 7 refs.

ORNL-3315 OTS $2.25

Oak Ridge National Lab., Tenn.
THERMONUCLEAR DIVISION. Semiannual progress rept. for period ending 30 Apr 62, on Contract W7405-eng-26. [1962] 101p. 29 refs. NASA N62-15561.

TID-17357(Pt. II) OTS $8.10

Ohio State U. Research Foundation, Columbus.
THE IMAGINARY PART OF THE OPTICAL POTENTIAL, by Ahmed F. Mohammed Abdel-Bary and H. J. Hausman. Final rept. pt. 2, 1 Jan 57-30 Sep 62, on Contract AT(11-1)503. Nov 62, 87p. 22 refs. RF Proj. 735.

TID-15535 OTS $1.60

Midwestern Universities Research Association, Madison, Wis.
A COMPUTER PROGRAM TO INVESTIGATE ORBIT STABILITY IN CIRCULAR ACCELERATORS, by G. Parzen, J. C. Anderson and others. [Rept. on Contract AT(11-1)284. Apr 62]. 13p.

Order from GPO $0.25 as C 13.46:163

National Bureau of Standards, Washington, D. C.
THE CONSTRUCTION OF CALORIMETERS FOR THE MEASUREMENT OF ABSORBED DOSE, by Ben Petree and George Ward. Nov 62, 36p. 17 refs. Technical note 163.

DESCRIPTORS: Measurement, *Energy, *Absorption, Radiation effects, *Calorimeters, Design, Dose rate, *Radiation measurement system components

Direct measurements of energy locally absorbed in irradiated materials can be made with adiabatic calorimeters of suitable design. Design criteria imposed by requirements of accuracy include limitations on size and complexity. Small calorimeters of simple design with precision better than one percent at dose rates above one rad per second have been developed. Details of fabrication, auxiliary equipment and performance are described. (Author)

PB 162 919 OTS $4.60

Naval Radiological Defense Lab., San Francisco, Calif.
A SCINTILLATION DETECTOR FOR GAMMA RADIACS, by W. R. Lamb. 20 Dec 57, 42p. 21 refs. Research and development technical rept. USNRDL-TR-242; AD-203 169.

DESCRIPTORS: *Scintillation counters, *Gamma rays, Detection, Radiation measurement systems, *Gamma counters, Design.

A detector was developed which consists of a liquid scintillant that converts nuclear radiation to light. A sensitive photodiode was designed and built which converts this light to electrical current, which in turn actuates an amplifier and indicating meter. The detector system operates on a few volts to give about 10^{-10} amp per roentgen per hour. Its response to various radiation energies is adjustable by filtering; for example, it may have uniform response to fission gamma energies. It is reasonably insensitive to mechanical and thermal stresses. (Author)

SLAC-4 OTS $0.50

Stanford Linear Accelerator Center, Stanford U., Calif.
ADIABATIC APPROXIMATION FOR DYNAMICS OF A PARTICLE IN THE FIELD OF A TAPERED SOLENOID, by R. H. Helm. Rept. on Contract AT(04-3)400. Aug 62, 18p. 1 ref. NASA N63-11869.

corrosion testing are presented. Physical property test data on as-received D6Ac, 300M, and R270 high strength steels are also given. (Author) (See also PB 162 905)

PB 162 907 OTS $2.60

Mellon Inst. [of Industrial Research, Pittsburgh, Pa.] STRESS CORROSION OF HIGH STRENGTH STEELS AND ALLOYS; ARTIFICIAL ENVIRONMENT, by C. J. Owen and W. D. Ruble. Quarterly scientific progress rept. (Rept. no. 9) 1 Jan-31 Mar 61, on Contract DA 36-034-ORD-3277RD. 20 Apr 61, 25p. 1 ref. AD-254 845.

DESCRIPTORS: *Titanium alloys, *Steel, *Rocket cases, Corrosion research, Stresses, *Corrosion, Corrosive gases, Test equipment, Corrosive liquids, Test methods, Tests, Sea water, Sodium compounds, Chlorides, Mechanical properties, Alloys.

U-bend and bent beam stress corrosion test results on high strength steels and alloys are presented. The sheet materials presently undergoing testing include: a low alloy steel (4137 Co), exposed to 7 synthetic and 4 natural environments; a Ti alloy (B120 VCA), exposed to three synthetic environments; a cold-worked PH alloy (AM355), exposed to 5 synthetic environments; and a heat-treated PH alloy (PH15-7 Mo), exposed to 5 synthetic environments. The low alloy test results indicate that the high strength level (a yield strength (Y. S.) of about 260 kpsi) is succeptible to stress corrosion in all environments. This is true for both U-bend (above the Y. S.) and bent beams (75% of the Y. S.) specimens. (Author) (See also PB 162 906)

AD-278 295 OTS $10.10

Ohio State U. Research Foundation, Columbus, Ohio. RESEARCH ON THE OXIDATION BEHAVIOR OF TUNGSTEN, by J. E. Battles, W. P. Meuli and others. Rept. for May 58-May 61, on Surface and Interface Phenomena of Matter, Contract AF 33(616)5721. Apr 62, 123p. 109 refs. ARL 62-324; NASA N62-14028.

DESCRIPTORS: *Tungsten, *Oxidation, Tungsten compounds, Dioxides, Thermodynamics, Vaporization, Phase studies, Water vapor, Oxides, Surfaces.

This paper is a summary of research conducted on the oxidation behavior of tungsten: (1) the thermodynamics of the W-O system have been determined; the W-O phase diagram has been ascertained and the thermodynamical functions for the various oxides of tungsten have been calculated; (2) the kinetics of oxidation of tungsten in the pressure range [A] 0.05 to 0.21 atmosphere, and [B] in the pressure range 10^{-10} to 10^{-13} atmosphere are described and interpreted; (3) the kinetics of volatilization of the oxides of tungsten in the presence and absence of water vapor are reported. (Author)

PB 162 909 OTS $11.50

Thompson Ramo Wooldridge, Inc., Cleveland, Ohio. AN INVESTIGATION OF THE CORROSION RESISTANCE OF METALLIC MATERIALS TO MOLTEN LITHIUM HYDRIDE AT CYCLIC ELEVATED TEMPERATURES, by E. J. Vargo and D. B. Cooper. Rept. on Contract NAS 5-462. June 62, 151p. 25 refs. Rept. no. ER-4774; NP-11952.

DESCRIPTORS: Corrosive liquids, *Heat exchangers, *Lithium compounds, *Hydrides, *Corrosion resistant alloys, Iron alloys, Nickel alloys, Cobalt alloys, *Molybdenum, Titanium, Metallography, Air, Argon, Hydrogen, Permeability, Diffusion, *Coatings, Heat resistant metals, Alloys

The corrosive effects of lithium hydride, lithium, and varying mixtures of lithium hydride and lithium upon various structural metals were investigated. These materials included iron-base, nickel-base, cobalt-base and refractory-base alloys as well as unalloyed molybdenum and titanium in the form of tubing. Sealed metal capsules of different designs containing the corrosive medium were used as test specimens. Multimetallic combinations of several of these metals were also employed in these tests. The tests were conducted in air, argon and hydrogen atmospheres for periods up to 3008 hours and were either conducted at static temperatures of 1500 or 1600°F or were cycled between the temperatures of 1165 and 1600°F. The relative permeability to hydrogen was also determined for these materials. Various coatings were evaluated for their effectiveness as hydrogen diffusion barriers.

NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

TID-15319 OTS $1.10

Argonne National Lab., Ill. COLORIMETRIC DETERMINATION OF IRON IN URANIUM-FISSION ELEMENT ALLOYS, by J. J. McCown and D. E. Kudera. Rept. on Contract W31-109-eng-38. Jan 62, 4p. 2 refs. UAC-5934.

ORO-520 OTS $12.00

Arkansas U., Fayetteville. RADIOACTIVE FALLOUT, by P. K. Kuroda, L. M. Fry and others. Annual progress rept. on Contract AT(40-1)2529. 31 Dec 61, 169p. 53 refs.

TID-16999 OTS $1.00

California Research Corp., Richmond. RADIATION STABILITY OF ORGANIC FLUIDS, by R. O. Bolt, M. L. Burrous and others. Progress rept. Apr-June 62, on Contract AT(04-3)248. 21 Sep 62, 43p. 6 refs. NASA N63-11828.

AD-287 127 Available from NAS-NRC, Washington 25, D. C. for $4.50

Kellogg Radiation Lab., Calif. Inst. of Tech., Pasadena. ENERGY LEVELS OF LIGHT NUCLEI - MAY 1962, by T. Lauritsen and F. Ajzenberg-Selove (Haverford Coll.). Technical rept. on Contract Nonr-220(18). May 62, 266p.

DESCRIPTORS: *Nuclear energy levels, *Nuclei, Helium, Lithium, Beryllium, Boron, Carbon, Nitrogen, Oxygen, Iron, Neon, Sodium.

This report is essentially an addendum to a review article by the authors which appeared in Nuclear Physics 11, 1-340 (1959). In the past three years, so much work has been done on the level structure of the light nuclei, that it was thought useful to list these papers and to draw up-to-date energy level diagrams.

UNC-5008-II OTS $2.50

United Nuclear Corp., White Plains, N. Y.
INVESTIGATION OF WET STEAM AS A REACTOR COOLANT (CAN-2). VOLUME II. CONCEPTUAL DESIGN EVALUATION OF A FOG-COOLED LIGHT WATER REACTOR, by M. Raber, G. Sofer and others. Final rept. on Contract AT(30-1)2828. 10 Aug 62, 125p. 17 refs. NYO-9844-II; EURAEC-502.

PHYSICS

AD-287 155 OTS $2.60

Chesapeake Bay Inst., Johns Hopkins U. [Annapolis, Md.]
A FISHING POLE THERMISTOR TEMPERATURE INDICATOR, by E.W. Schiemer. Sep 62, 22p. Technical rept. 29; Reference 62-19.

DESCRIPTORS: *Thermistors, Temperature, Fishes, Rods, Sea water, Design.

The instrument described was designed in response to a request from fisheries scientists who had need of a device which would measure the temperature of the water at the time and position that a fish took an angler's baited hook. As designed and built, the device enables temperatures between 40°F and 100°F to be measured to an accuracy of 0.2°F at a point close to the hook of a rod and reel fishing outfit.

LAMS-2795 OTS $1.75

Los Alamos Scientific Lab., N. Mex.
ON THE COMPUTATION OF THE TRANSPORT OF RADIATION, by Burton Wendroff. Rept. on Contract W7405-eng-36. Nov 62, 74p. 12 refs. NASA N63-12174.

LA-2806 OTS $0.75

Los Alamos Scientific Lab., N. Mex.
THEORY OF CORRESPONDENCE BETWEEN FLUID DYNAMICS AND PARTICLE-AND-FORCE MODELS, by Francis H. Harlow. Rept. on Contract W7405-eng-36. Nov 62, 28p. 7 refs.

PB 163 015 OTS $3.60

Moore School of Electrical Engineering, U. of Pennsylvania, Philadelphia.
DIFFRACTION OF RADIO FREQUENCY WAVES, by P. P. Lombardini. Final rept. 15 Apr-15 Nov 58, on Contract N62269-507. 15 Dec 58, 33p. 13 refs. Moore School rept. no. 59-11.

DESCRIPTORS: *Radio waves, *Diffraction, Propagation, Electromagnetic waves, Electromagnetic wave reflections, Electromagnetism, Geophysics.

Several topics of applied electromagnetic theory are discussed: (1) boundary relations at the surface of an imperfectly conducting body; (2) optics and propagation of inhomogeneous waves; and (3) radiation and diffraction in a dissipative medium.

Order from GPO $0.15 as C 13.46:152

National Bureau of Standards, Washington, D. C.
COORDINATED COLOR IDENTIFICATIONS FOR INDUSTRY, by Kenneth L. Kelly. Nov 62, 11p. 14 refs. Technical note 152.

DESCRIPTORS: *Colors, *Identification, Standards, Identification systems, Industrial psychology.

When a color is to be identified, the preciseness required of the identification is the first consideration. Usually this is determined by a trial-and-error method which can be both costly and time-consuming. For some uses, a color name consisting of a hue name or a hue name and modifier is sufficient while for others, a notation of the color in a color-order system will suffice. Where maximum precision is required, the color should be measured instrumentally and the results expressed numerically. This paper describes the coordinated series of five levels of fineness of color identification developed by ISCC Subcommittee for Problem 23, the Expression of Historical Color Usage, and is based on the ISCC-NBS method of designating colors. It lists the methods for changing from one level to another and gives examples of the use of each level. (Author)

AD-287 244 OTS $1.10

North Carolina State Coll., Raleigh.
THE DAMPED OSCILLATIONS OF A SIMPLE PENDULUM, by Raimond A. Struble and T. C. Harris. Technical memo. no. 2 on Grant DA-ARO(D)-31-124-G81. July 62, 6p. 3 refs. AROD rept. 2125.23; NASA N62-13455.

DESCRIPTORS: *Oscillators, *Nonlinear systems, Differential equations, Functions, Motion, Viscosity, Harmonic oscillators, Integrals, *Damping.

A number of important nonlinear differential equations are readily integrable. An example is afforded by the equation (1) $\ddot{x} + \sin x = 0$, which depicts the undamped oscillations of a simple pendulum. It is the purpose of this note to illustrate, with the pendulum problem, a technique for obtaining quantitative information about the free oscillations of a (viscous) damped nonlinear system. The system is first transformed to a quasi-harmonic form; then the perturbational procedure is applied.

Acoustics

PB 162 976 OTS $1.60

Naval Medical Research Lab., New London, Conn.
SURVEY AND ANALYSIS OF ENGINE ROOM NOISE IN REPRESENTATIVE SUBMARINES AND ASSOCIATED VESSELS, by J. Donald Harris. Rept. on Proj. NM 003 041.56.08. 3 Jan 57, declassified 20 June 60, 13p. 3 refs. Rept. no. 282, Vol. 16, no. 4.

DESCRIPTORS: Noise, *Submarines, *Engine noise, Analysis, Measurement, Audiometry.

Vessels of all types attached to Submarine Force, Atlantic Fleet, were classified as to type of main engine, and representative boats of each type were surveyed with a sound level meter and associated

SLAC-2 OTS $1.00

Stanford Linear Accelerator Center, Stanford U., Calif.
DISCUSSION OF FOCUSING REQUIREMENTS FOR THE STANFORD TWO-MILE ACCELERATOR, by R. H. Helm. Rept. on Contract AT(04-3)400. Aug 62, 42p. 7 refs.

SLAC-6 OTS $1.00

Stanford Linear Accelerator Center, Stanford U., Calif.
THE PRINCIPLE OF DESIGN OF MAGNETIC MOMENTUM SLITS, by E. L. Chu and J. Ballam. Rept. on Contract AT(04-3)400. Oct 62, 39p. 5 refs. NASA N63-11870.

SLAC-3 OTS $1.00

Stanford Linear Accelerator Center, Stanford U., Calif.
SHOWER DEVELOPMENT AND HEATING IN THE WAVEGUIDE STRUCTURE WITH AN 800 MEV ELECTRON BEAM, by J. K. Cobb and J. J. Muray. Rept. on Contract AT(04-3)400. July 62, 34p. 3 refs. NASA N63-11868.

PB 162 813 OTS $5.60

Stanford Research Inst., Menlo Park, Calif.
A REVIEW OF DOSIMETRY FIELD, by S. I. Taimuty. Rept. no. 4 (Final), 14 Sep 61-13 Sep 62, on Contract DA 19-129-QM-1900. 10 Sep 62, 56p. 26 refs. File no. S-611.

DESCRIPTORS: *Reviews, *Dosimeters, Health physics instrumentation.

This report presents a review and critical evaluation of the literature on high-level radiation dosimetry published since 1958. The purpose of the review was to establish whether recent dosimetry research has developed any new dosimeters which are suitable for use in the Quartermaster Radiation Laboratory and for inclusion in a dosimetry handbook to be prepared as part of this contract work. Of the 13 new dosimeters disdussed in the report, only three, oxalic acid, polyisobutylene, and Mylar film, seem sufficiently promising to warrant further development. Their current states of development are not sufficiently far advanced, however, to warrant their inclusion in a definitive dosimetry handbook. It is recommended that only the Fricke and ceric sulfate dosimeters be included in the dosimetry handbook, but that additional work should be done on oxalic acid, polyisobutylene, and Mylar as dosimetry materials. (Author)

Nuclear Engineering

NAA-SR-7077 OTS $1.25

Atomics International, Canoga Park, Calif.
THE DEVELOPMENT OF LINEAR POWER DETECTION AND RECORDING INSTRUMENT SYSTEMS FOR THE KINETIC EXPERIMENTS ON WATER BOILERS, by E. L. Gardner. Rept. on Contract AT(11-1)GEN-8. 1 Feb 63, 48p. 18 refs. NASA N63-12208.

NAA-SR-7288 OTS $1.00

Atomics International, Canoga Park, Calif.
STATISTICAL ANALYSIS OF SNAP 10A THERMOELECTRIC CONVERTER ELEMENT PROCESS DEVELOPMENT VARIABLES, by S. H. Fitch and J. W. Morris. Rept. on Contract AT(11-1)GEN-8. Dec 62, 38p. 8 refs. NASA N63-12742.

WAPD-264 OTS $3.00

Bettis Atomic Power Lab., Pittsburgh, Pa.
THE IRRADIATION BEHAVIOR OF ZrO_2-UO_2 FUELS, by B. F. Rubin, R. M. Berman, and M. L. Bleiberg. Rept. on Contract AT(11-1)GEN-14. Oct 62, 220p. 28 refs.

WAPD-MRP-100 OTS $2.50

Bettis Atomic Power Lab., Pittsburgh, Pa.
PRESSURIZED WATER REACTOR (PWR) PROJECT. Technical progress rept. 24 Aug-23 Oct 62, on Contract AT(11-1)GEN-14. [1962] 131p.

UCRL-5484(Del.) OTS $3.50

Lawrence Radiation Lab., U. of California, Livermore.
TORY II-A. A NUCLEAR RAMJET TEST REACTOR, ed. by James W. Hadley. Rept. on Contract W7405-eng-48. 4 Nov 59. 295p. 30 refs.

LAMS-2814 OTS $1.00

Los Alamos Scientific Lab., N. Mex.
REACTOR IRRADIATION OF URANIUM-IMPREGNATED GRAPHITE AT 1500°C TO 10% BURNUP. by P. J. Peterson, J. A. Leary, and W. J. Maraman. Rept. on Contract W7405-eng-36. Dec 62, 42p. 17 refs. NASA N63-12690.

TID-15645 OTS $3.60

Michigan U., Ann Arbor.
GREULING-GOERTZEL CALCULATIONS IN HEAVY WATER, by Robert J. Mack. Master's thesis. 14 Aug 59, 34p. 5 refs.

Y-1410 OTS $1.50

Union Carbide Nuclear Co., Oak Ridge, Tenn.
SALT BATH HEAT TRANSFER RATES FOR URANIUM PLATE, by R. B. Burditt. Rept. on Contract W7405-eng-26. 26 Aug 60, 62p. 5 refs. NASA N63-12496.

UNC-5008-I OTS $3.00

United Nuclear Corp., White Plains, N. Y.
INVESTIGATION OF WET STEAM AS A REACTOR COOLANT (CAN-2). VOLUME I. BEHAVIOR OF A FOG FLOW AS A COOLANT, by R. P. Stein, H. Firstenberg and others. Final rept. on Contract AT(30-1)2828. 10 Aug 62, 217p. 71 refs. NYO-9844-I.

Molecular Physics and Spectroscopy

TID-16853 OTS $1.10

Emory U., Ga.
INFRARED SPECTROPHOTOMETRY OF AQUEOUS NITRATE, NITRITE, AND SULFATE SOLUTIONS, by A. L. Underwood, Michael W. Miller, and Lyman H. Howe, III. Rept. on Contract AT(40-1)2046. Oct 62, 8p. 13 refs.

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NAS 1.12:92

Langley Research Center, National Aeronautics and Space Administration, Langley [Station] Va.
AN INVESTIGATION OF THE EFFECT OF HIGH TEMPERATURE ON THE SCHUMANN-RUNGE ULTRAVIOLET ABSORPTION CONTINUUM OF OXYGEN, by John S. Evans and Charles J. Schexnayder, Jr. 1961, 49p. 67 refs. NASA Technical rept. R-92.

DESCRIPTORS: *Oxygen, Argon, Absorption spectrum, Excitation, *Spectra (Visible and ultraviolet), Shock tubes, *Shock waves, *High temperature research.

A theoretical and experimental investigation has been carried out to determine the absorption coefficient of molecular oxygen at high temperature. The wavelength range was chosen to cover the Schumann-Runge continuum between 1,300 and 1,750 angstrom units. The theoretical investigation covered temperatures from 300° to 10,000° K. The experimental investigation was carried out in the range from 4,000° to 10,000° K. (Author)

UCRL-10504 OTS $0.75

Lawrence Radiation Lab., U. of California, Berkeley.
ENERGY EXCHANGE BETWEEN COLD GAS MOLECULES AND A HOT TUNGSTEN SURFACE, by Gerald Leroy DePoorter. Master's thesis. Rept. on Contract W7405-eng-48. 12 Nov 62, 34p. 12 refs. NASA N63-12420.

UCRL-10510 OTS $2.00

Lawrence Radiation Lab., U. of California, Berkeley.
THE RANDOM-PHASE APPROXIMATION APPLIED TO ATOMIC STRUCTURE, by Philip L. Altick. Doctoral thesis. Rept. on Contract W7405-eng-48. 15 Oct 62, 84p. 39 refs. NASA N63-11136.

Solid State Physics

NASA N63-11807 OTS $1.10

Advanced Technology Labs., Mountain View, Calif.
RESEARCH ON DIFFUSION OF HYDROGEN THROUGH PALLADIUM, by R. E. Corridan. Quarterly progress rept. Jan-Apr 62, on Contract NAS7-118. [1962] 14p. 3 refs. ATL-D-786.

UCRL-10497 OTS $0.75

Lawrence Radiation Lab., U. of California, Berkeley.
THE EFFECT OF HYDROSTATIC PRESSURE ON THE LOW-TEMPERATURE THERMOLUMINESCENCE OF NaCl, by William V. Macnabb. Master's thesis. Rept. on Contract W7405-eng-48. 9 Oct 62, 26p. 14 refs.

UCRL-7128 OTS $1.00

Lawrence Radiation Lab., U. of California, Livermore.
HIGH-PRESSURE INVESTIGATIONS OF GROUP III ELEMENTS: PART I. FUSION CURVES AND POLYMORPHIC TRANSITIONS OF ALUMINUM, GALLIUM, INDIUM, AND THALLIUM AT HIGH PRESSURES. PART II. PHASE TRANSFORMATIONS IN URANIUM AT HIGH PRESSURES, by A. Jayaraman, W. Klement, Jr. and others. Rept. on Contract W7405-eng-48. 1 Nov 62, 37p. 46 refs.

UCRL-6893 OTS $8.10

Lawrence Radiation Lab., U. of California, Livermore.
LATTICE DYNAMICS AND SPECIFIC HEAT DATA FOR ROCKSALT STRUCTURE ALKALI HALIDES, by Arnold M. Karo and John R. Hardy. Rept. on Contract W7405-eng-48. 18 Apr 62, 86p. 38 refs.

PB 162 879 OTS $6.60

New Jersey Ceramic Research Station, Rutgers U., New Brunswick.
THE FLAME FUSION SYNTHESIS OF SILICATE STRUCTURE TYPES, by W. H. Bauer and I. Gordon. Technical rept. no. 2 on Contract N7onr-454, Task 2. 1 May 50, 62p. 27 refs.

DESCRIPTORS: *Single crystals, *Silicon crystals, *Silicates, Synthesis, *Crystal growth, *Synthetic stones, Physical properties, Nucleation, Furnaces.

Flame fusion offers a new approach to the field of silicate technology. The measurement of single crystals, rather than polycrystalline (several compounds) or multicrystalline (one compound) masses embedded in a glassy matrix, determines the optical, electrical, thermal, and other physical properties without any extraneous influences. The technique contributes to the development of highly controlled experimentation based on crystal chemistry considerations.

AD-274 744 OTS $10.10

Nuclear Corp. of America, Denville, N. J.
UNIJUNCTION DEVICES MADE FROM RARE EARTH SEMICONDUCTORS, by Nathan Sclar. Final rept. 1 Jan-31 Dec 61 on Contract DA 36-039-sc-87392. [1962] 123p. 35 refs.

DESCRIPTORS: *Single crystals, *Semiconductors, *Rare earth compounds, *Borides, *Nitrides, Preparation, Synthesis, Crystal growth, Measurement, Optics, Electrical properties, Thermoelectricity, Hall effect, Diffusion, Chemical impurities, Physical properties, Cerium compounds, Dysprosium, Erbium, Holmium compounds, Yttrium compounds, Scandium, Gadolinium compounds, Lanthanum compounds, Neodymium compounds

octave-band analyzer. The ambient noise in all engine rooms was found to be higher than that stated to be innocuous by BuMed Instruction 6260.6, and most engine room levels were higher than more lenient criteria for noise laid down by national advisory committees. It was concluded that audiometric monitoring of men working in such spaces should be continued and expanded, and that the other features of a good hearing conservation program, as laid down in BuMed Instructions 6260.6, should be instituted and agressively pursued. (Author)

PB 162 897 OTS $5.60

[Office of Research Administration] U. of Michigan, Ann Arbor.
ON THE PROPAGATION OF SOUND IN MONATOMIC GASES, by C. S. Wang Chang and G. E. Uhlenbeck. Rept. on Contract N6onr-23222. Oct 52, 55p. 10 refs. Project no. M999; AD-9294.

DESCRIPTORS: *Sound transmission, Propagation, *Gases, Transport properties, Diffusion, Molecules, Models (Simulations), Kinetic theory, Matrix algebra, Integral equations, Polynomials, Determinants.

The Boltzmann equation for a monatomic gas with no external force is stated for a small disturbance (h) from equilibrium in terms of a collision operator J. From this equation an exact dispersion law is derived for gases. Partial lists of eigenfunctions and eigenvalues are obtained for the collision operator for Maxwell molecules (molecules repelling with a Kr^{-5} force law). A successive approximation method gives the dispersion law as a series in λ/Λ, the ratio of mean free path to the wave length of wound. The extension to molecular models other than Maxwell's is discussed. (ASTIA abstract)

Electronics

UCRL-10366 OTS $1.50

Lawrence Radiation Lab., U. of California, Berkeley.
ELECTRON-ENERGY DISTRIBUTIONS AND IONIZATION RATES IN HYDROGEN WITH CROSSED ELECTRIC AND STRONG MAGNETIC FIELDS, by Gary A. Pearson and Wulf B. Kunkel. Rept. on Contract W7405-eng-48. 5 Sep 62, 61p. 21 refs. NASA N63-12419.

TID-17336 OTS $2.60

Florida U., Gainesville.
COLLECTIVE MOTION IN A BEAM-PLASMA SYSTEM, by B. N. A. Lamborn. Technical rept. no. 7, on Contract AT(40-1)2783. 15 Nov 62, 21p.

PB 162 938 OTS $1.60

Naval Ordnance Test Station, China Lake, Calif.
EQUATIONS OF STATE OF METAL PLASMAS, by H. S. Green. 1 Apr 60, 20p. 13 refs. NOTS TP 2478; NAVWEPS rept. 7073; AD-246 255.

DESCRIPTORS: *Equations of state, *Plasma physics, *Metals, Quantum mechanics, Ions, Lattices, Electrons, *Thermodynamics

Equations of state are reviewed for metal plasmas. In the high-temperature metal gas, the method of Yvon-Kirkwood-Born-Green, (General Kinetic Theory of Liquids, C.U.P., 1949), as developed by Yvon for the Coulomb interaction case, is modified to take account of quantum corrections. The treatment of the solid state case is directly quantal, and takes into account motion of ions about lattice positions, motion of electrons in ionic field, long-range electron correlations, and (as in high-temperature case) short-range electron correlations. (Author)

AD-287 001 OTS $8.10

Stanford Electronics Labs., Stanford U., Calif.
LARGE-SIGNAL ANALYSIS OF PARAMETRIC FREQUENCY MULTIPLIERS, by D. B. Leeson. Rept. on Contract Nonr-225(31). May 62, 88p. 22 refs. Technical rept. no. 1710-1; SEL-62-068.

DESCRIPTORS: *Frequency multipliers, *Capacitors, *Diodes, Electrostatic capacitance, Nonlinear systems, Voltage, Electronic circuits, Tuning circuits, Transducers, Diffusion, Effectiveness, Numerical analysis, Mathematical analysis, Taylor's series, Experimental data.

A general method of analysis for large-signal parametric frequency multipliers is presented. The particular nonlinear elements treated are the metal-oxide-silicon (MOS) capacitor, the depletion-layer capacitance of a junction diode, and the diffusion capacitance of a junction diode. The method is based on a Taylor series expansion about the d-c-plus-fundamental voltage (or charge) applied to the capacitor. The harmonic quantities form the higher order terms of the series. The analysis is restricted to use of the first term only, and agreement with large-signal measurements is satisfactory. The general analysis, numerical examples, and experimental results indicate a suitable criterion for the choice of varactors in a two-filter parametric multiplier. Excellent correlation with forward-region characteristics is predicted and is found in experiment. (Author)

AD-286 916 OTS $8.60

Technical Research Group, Syosset, N. Y.
RESEARCH ON PROPERTIES OF LASER DEVICES, ed. by M. Newstein and S. Winsberg. Quarterly technical summary rept. no. 1, June-Aug 62, on Contract AF 49(638)673. [1962] 95p. 12 refs. Rept. no. TRG-134-QTR-1; ARPA Order no. 356-62; NASA N62-17186.

DESCRIPTORS: *Lasers, Materials, Design, Cesium, Thallium compounds, Bromieds, Rare earth elements, Ions, Gases, Solids, Oscillators, Glass, Crystals, Single crystals, Tuned circuits, Calcium compounds, Tungstates, Fluorides, Impurities.

Cesium gas LASERs designed to operate in the milliwatt range at 3μ and 7μ have been under construction. Photodissociated TlBr was investigated as a possible gaseous LASER medium. Crystalline and glassy media for rare earth ions were studied. Measurements were made on the time development of the output from the pulse oscillator and comparison was made with theory. The theory was extended to obtain the angular distribution of the output pulse. LASER cavities have been setup whose reflectors are totally reflecting cube corners or crossed roof prisms. (Author)

Correlations which predict the critical heat flux are presented and compared with the experimental data available. The importance of two-phase-flow considera tions in understanding the heat-transfer phenomena prompted the inclusion of additional sections regarding flow regimes and the pressure drops in flowing two-phase media. Appended is a summary of physical properties for various liquid metals and water. (Author)

NBS-7218 OTS $2.60

National Bureau of Standards, Boulder, Colo.
CRYOGENIC ASPECTS OF PROJECT SHERWOOD. Progress rept. no. 8, for 1 Oct-31 Dec 61. 31 Dec 61, 29p. 7 refs.

Order from GPO $0.45 as
C 13.46:120

National Bureau of Standards, Boulder, Colo.
A TABULATION OF THE THERMODYNAMIC PROPERTIES OF NORMAL HYDROGEN FROM LOW TEMPERATURES TO 300° K AND FROM 1 TO 100 ATMOSPHERES, by John W. Dean. Nov 61, 74p. 6 refs. Technical note 120.

DESCRIPTORS: *Hydrogen, *Thermodynamics, *Tables, Pressure, Volume, Energy, Temperature, Enthalpy, Entropy.

Pressure, volume, temperature, internal energy, enthalpy, and entropy of normal hydrogen gas have been tabulated along isobars in 1°K temperature steps. The range covered is from the saturation temperature to 300°K and from a pressure of 1 to 100 atmospheres. The source of data is the Research Paper 1932 of the National Bureau of Standards Journal of Research. The method is described by which the data presented in Research Paper 1932 is reduced to properties directly useful for engineering calculations. A method is also described for estimating the effect of ortho-para compositions upon the tabulated properties. Tabular values are presented in the dimensional units of the metric system. The tabulations are also available in the dimensional units of the British system as Technical Note No. 120, Supplement A. (Author)

Studies on the rare earth nitrides and hexaborides are described. The theoretical work indicates the nitrides to be semiconductors in the 2 ev energy gap range with high mobilities and the hexaborides to be semiconductors in the 3 ev volt range. These predications are borne out by experimental optical transmission studies which establish these rare earth semiconductor gaps from the position of the absorption edges. Room temperature resistivity and Hall effect measurements showed these materials to be characterized by high charge carrier concentration exhibiting high mobilities. Thermoelectric measurements as a function of temperature indicate promise for the hexaborides (primarily) as high temperature thermoelectric materials. Stoichiometry was not obtained in these compounds with the nitrides realizing only up to 90% of theoretical N content and the hexaborides showing a contribution from the tetraboride phase. Observed chemical instabilities of nitrides are believed due to the lack of stoichiometry. The hexaborides were stable refractory compounds. (Author)

TID-16784 OTS $1.10

Pittsburgh U., Pa.
SINGLE CRYSTAL DATA OF SOME TETRAMERIC ALUMINUM ALKOXIDES, by E. L. Amma. Rept. on Contract AT(30-1)2669. [1960] 4p. 6 refs.

TID-16102 OTS $1.60

Sandia Corp., Albuquerque, N. Mex.
TRANSIENT PHOTOCONDUCTIVITY OF POLYSTYRENE AND POLYISOBUTYLENE EXPOSED TO PULSES OF NEUTRON AND GAMMA RADIATION, by F. N. Coppage. Rept. on Contract AT(29-1)789. June 62, 19p. 12 refs. SCDC-2686.

PB 162 942 OTS $4.60

Westinghouse Electric Corp., Youngwood, Pa.
RESEARCH IN PREPARATION OF HYPERPURE SINGLE CRYSTAL SILICON CARBIDE, by R. F. Cornelissen. Scientific rept. no. 3, 1 Jan 57-31 Mar 58, on Contract AF 19(604)2174. 15 Apr 58, 41p. 6 refs. AFCRC-TN-58-172; AD-152 414.

DESCRIPTORS: *Single crystals, *Silicon crystals, Silicon compounds, Carbides, *Crystal growth, Nucleation, Heat transfer, Impurities, Control, *Furnaces, Design, Operation, Crystal lattice defects, Chemical analysis, Spectrographic analysis, Electrical properties.

Hexagonal single crystal platelets of SiC were grown from the vapor phase at about 2500°C in a graphite resistance-heated furnace with pure Si and C as the starting materials. The investigation followed the general course of reproducing and improving Lely's method. A thin graphite tube with 0.003- to 0.007-in.-thick walls was successfully used as a substrate for controlled nucleation. The growth and nucleation mechanism of SiC were first studied to establish the necessary conditions for the growth of large, perfect, and pure crystals. The concept of growth lines and their relations to the nucleation and crystal formation is introduced. The periodic admission of N to the growth region produced green colored bands in crystals which permitted the calculation of the growth rate and nucleation time. An explanation was postulated for the formation of platelets in which radiation is considered the dominant heat transfer mechanism and checked experimentally. X-ray rocking curves measurements on clear crystals indicated only slight misalignment of the lattices. Both p- and n-type crystals were prepared; the purest n-type gave resistivity measurements from 10^6 to 10^7 ohm-cm at room temperature. (ASTIA abstract) (See also PB 135 545)

Thermodynamics

NASA N63-11131 OTS $1.00

Langley Research Center, National Aeronautics and Space Administration, Langley [Station] Va.
AN ANALYTICAL INVESTIGATION OF ABLATION, by Bernard Rashis and Russell N. Hopko. July 60, declassified 17 July 62. 41p. 25 refs. Technical memo. X-300.

UCRL-7118 OTS $1.25

Lawrence Radiation Lab., U. of California, Livermore.
THE THERMODYNAMIC FUNCTIONS FOR WATER IN THE RANGE -10 TO 1000°C AND 1 TO 250,000 BARS, by W. E. Sharp. Rept. on Contract W7405-eng-48. 23 Oct 62, 51p. 9 refs. NASA N63-11179.

LAMS-2809 OTS $1.00

Los Alamos Scientific Lab., N. Mex.
THE RATH MESHER: A 7090 PROGRAM FOR PREPARING INPUT DATA FOR HEAT CONDUCTION CODES, by Richard F. Thomas, Jr. Rept. on Contract W7405-eng-36. Dec 62, 37p. 6 refs. NASA N63-12259.

LA-2813 OTS $0.50

Los Alamos Scientific Lab., N. Mex.
THERMODYNAMIC FUNCTIONS FOR PURE PLUTONIUM, by Robert N. R. Mulford. Rept. on Contract W7405-eng-36. Nov 62, 11p. 12 refs. NASA N63-12603.

PB 181 478 OTS $3.00

Michigan U. Coll. of Engineering, Ann Arbor.
LITERATURE SURVEY ON LIQUID METAL BOILING, by Richard E. Balzhiser, John A. Clark and others. Final rept. phase 1, on Contract AF 33(616)8277. Oct 62, supersedes rept. dated Dec 61, 159p. 1330 refs. Rept. no. 04526-2-F; ASD-TR-61-594.

DESCRIPTORS: *Liquid metals, *Coolants, *Heat transfer, Cooling, Fluid mechanics, Water, Steam, Air, *Film boiling, *Nucleate boiling, Boiling, Acceleration, Gravity, Physical properties, Plastic flow, Thermodynamics, *Bibliography

A survey was originated for the purpose of collecting and evaluating information pertaining to the current status of liquid-metal-boiling technology. Existing correlations for predicting heat-transfer coefficients in the nucleate- and film-boiling regimes are simmarized.

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